Visual positioning laser cutting control system

Manual

V1.0

目录

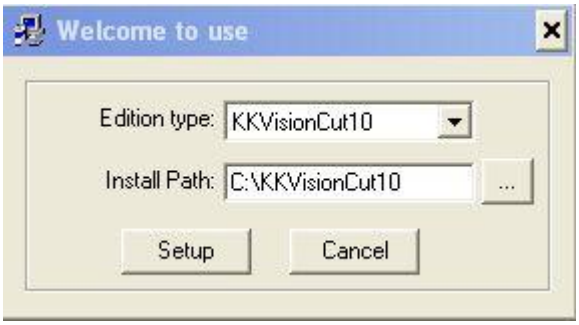
1 System Installation

1.1 Contents of the Control System

Control System includes hardware & control software. The hardware includes AMC6340 motion control card, camera and related connection lines; Software includes control software and drivers. All in the package include software CD.

1.2 Installation of the software

Open the Install folder, double-click Setup.exe, then the following dialog box appears:

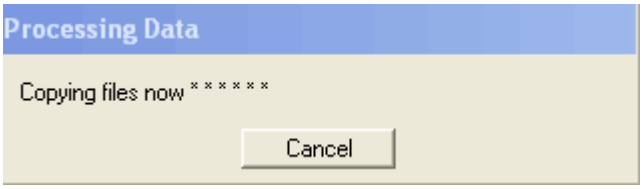


Click "**Setup**" to install the driver and application software to the specified directory.

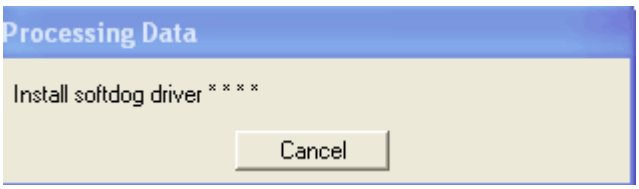
The default installation path is C:\KKVisionCut10. Click 

to change the installation path.

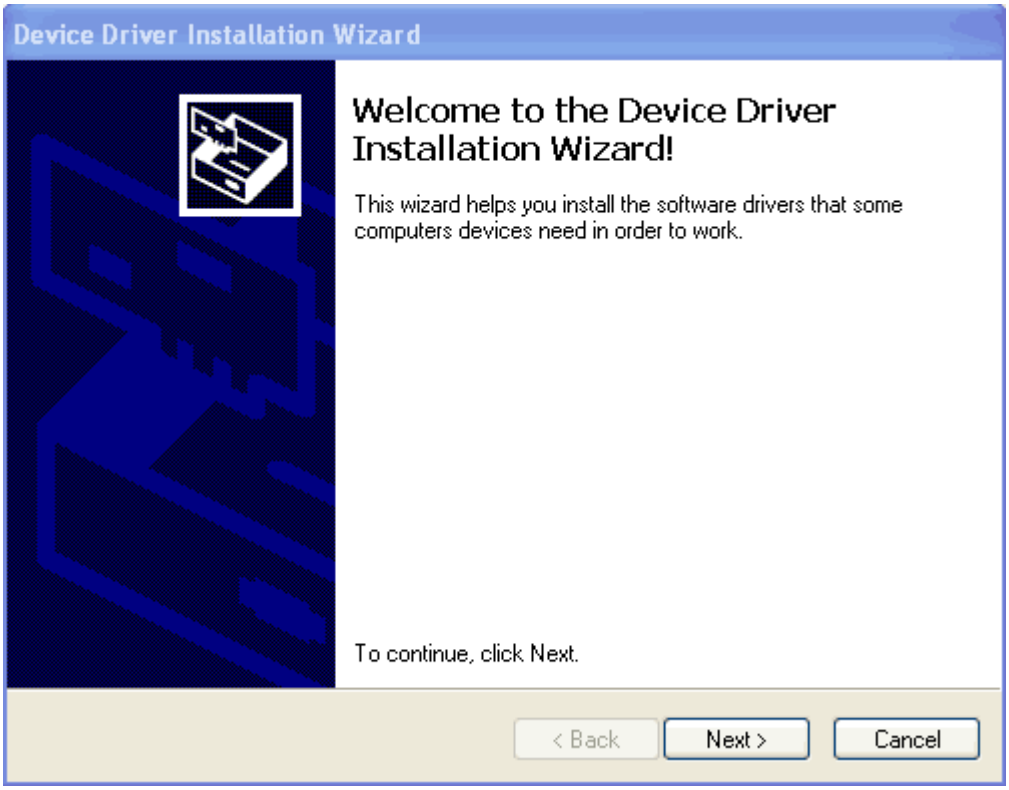
Click "**Setup**" button, the following dialog box appears:



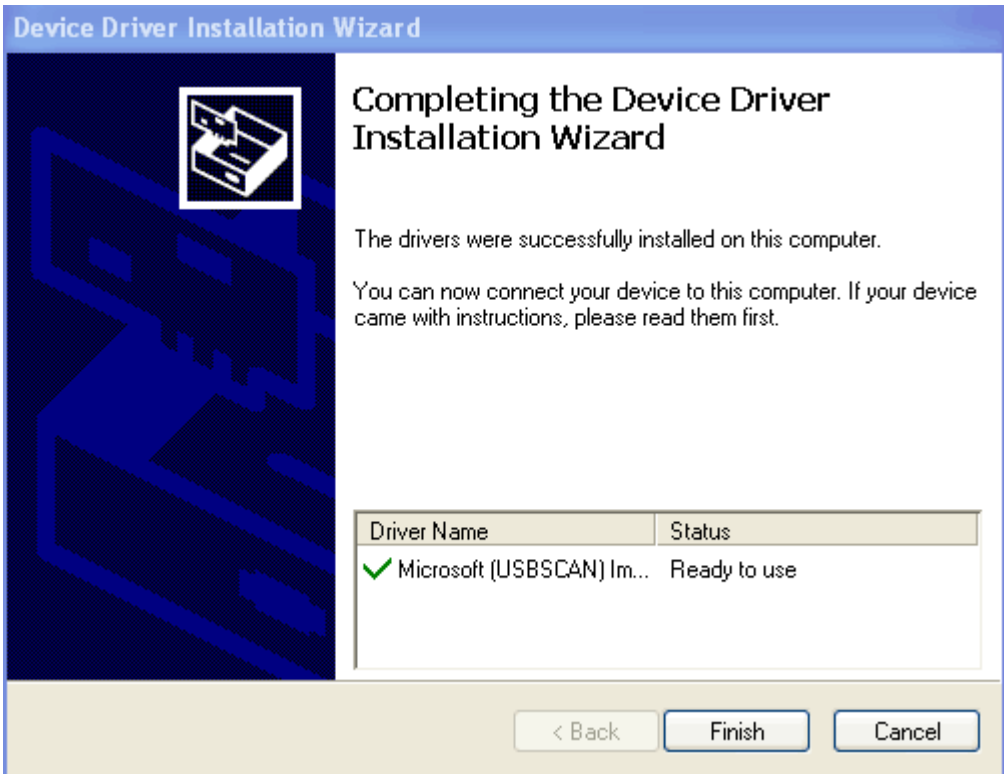
Later there will be the following dialog box appears:



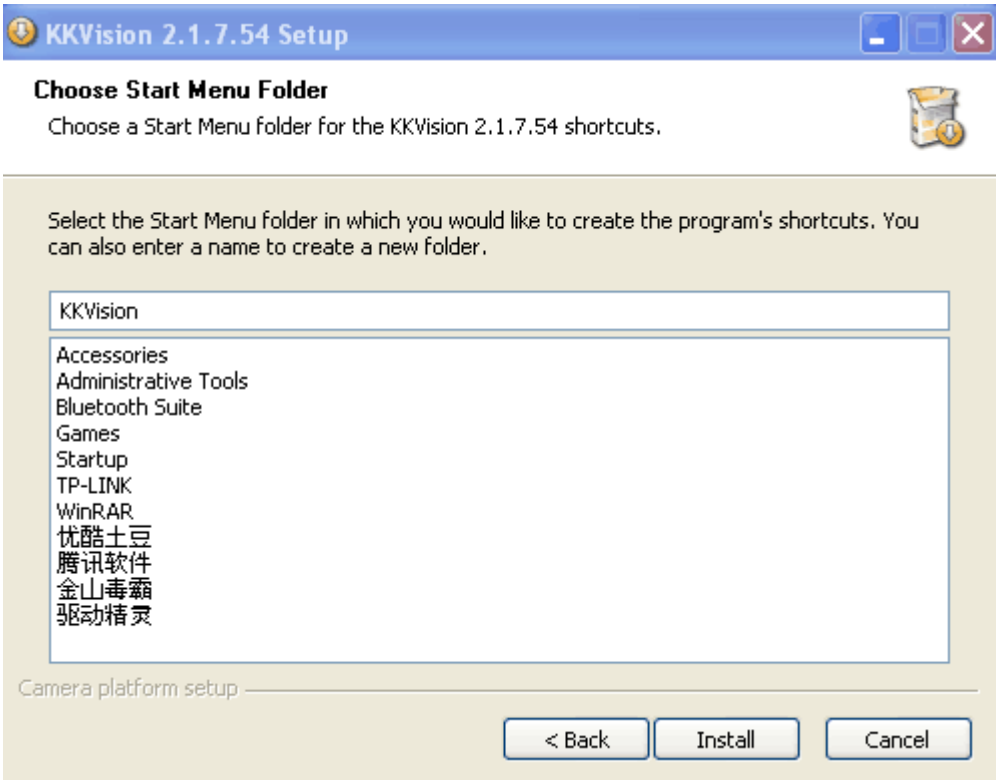
Click “Cancel” button to cancel the installation of the control system.



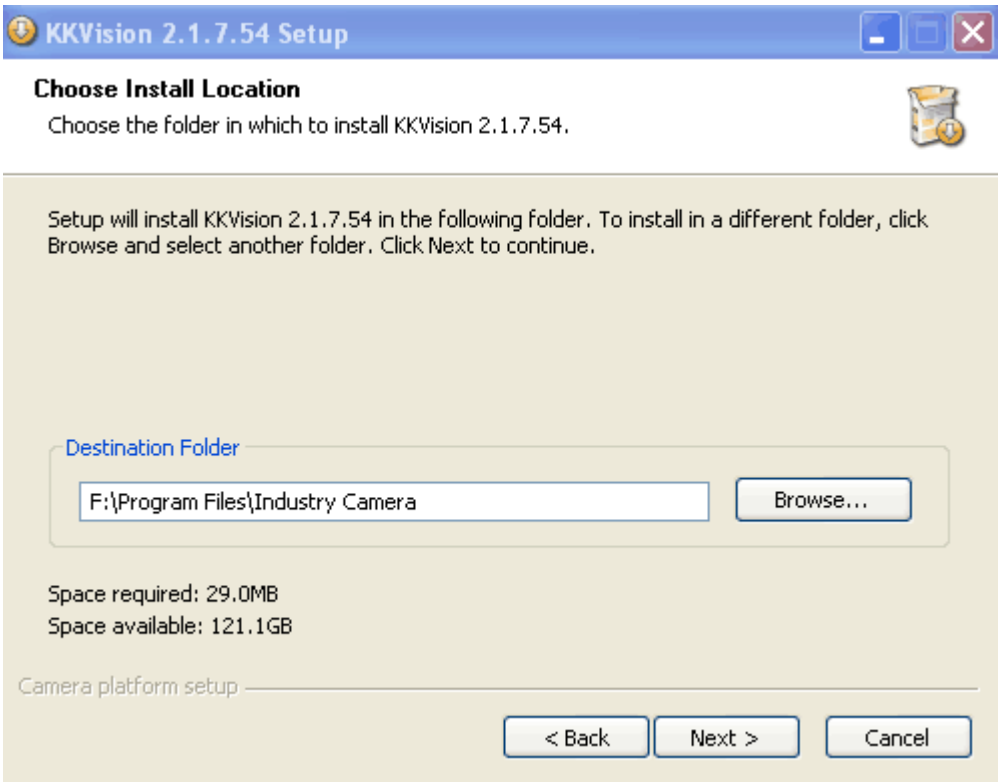
Click “**Next**” button, the following dialog box appears:



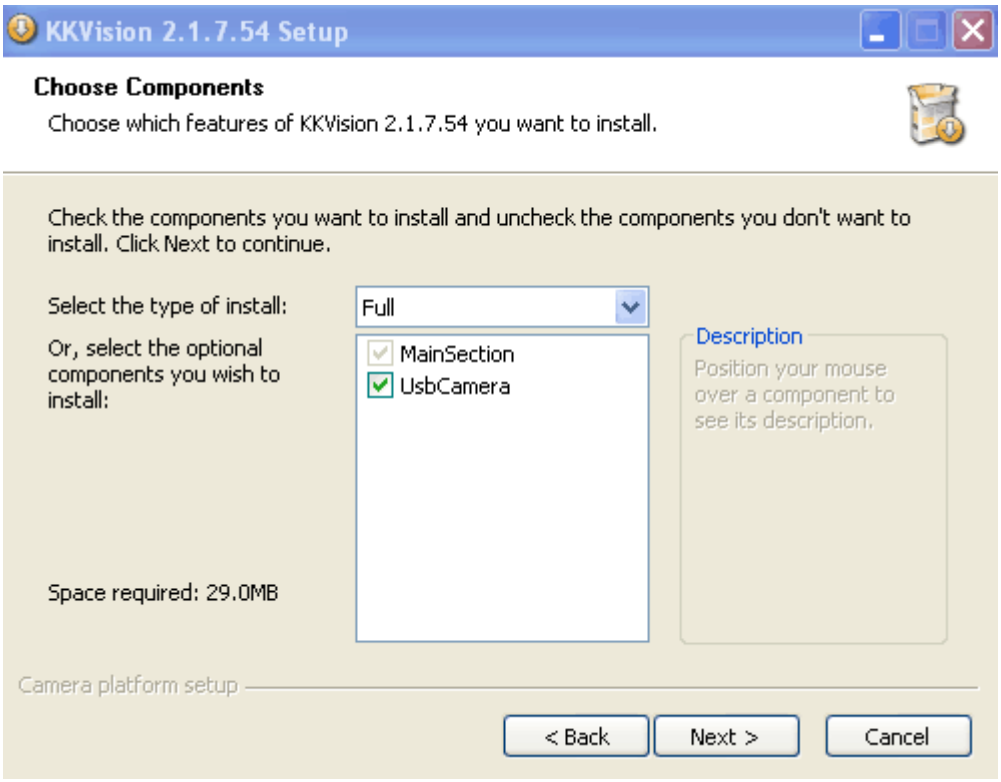
Then automatically install the camera driver:



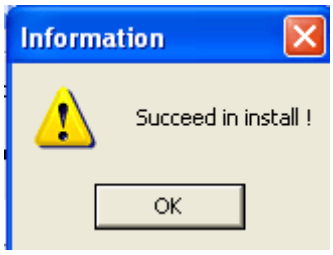
Click "**Install**" button, the following dialog box appears:



Click “**Next**” button, the following dialog box appears:



Click “**Next**” button, the following dialog box appears:



Click "**OK**" to complete the installation of the control software.

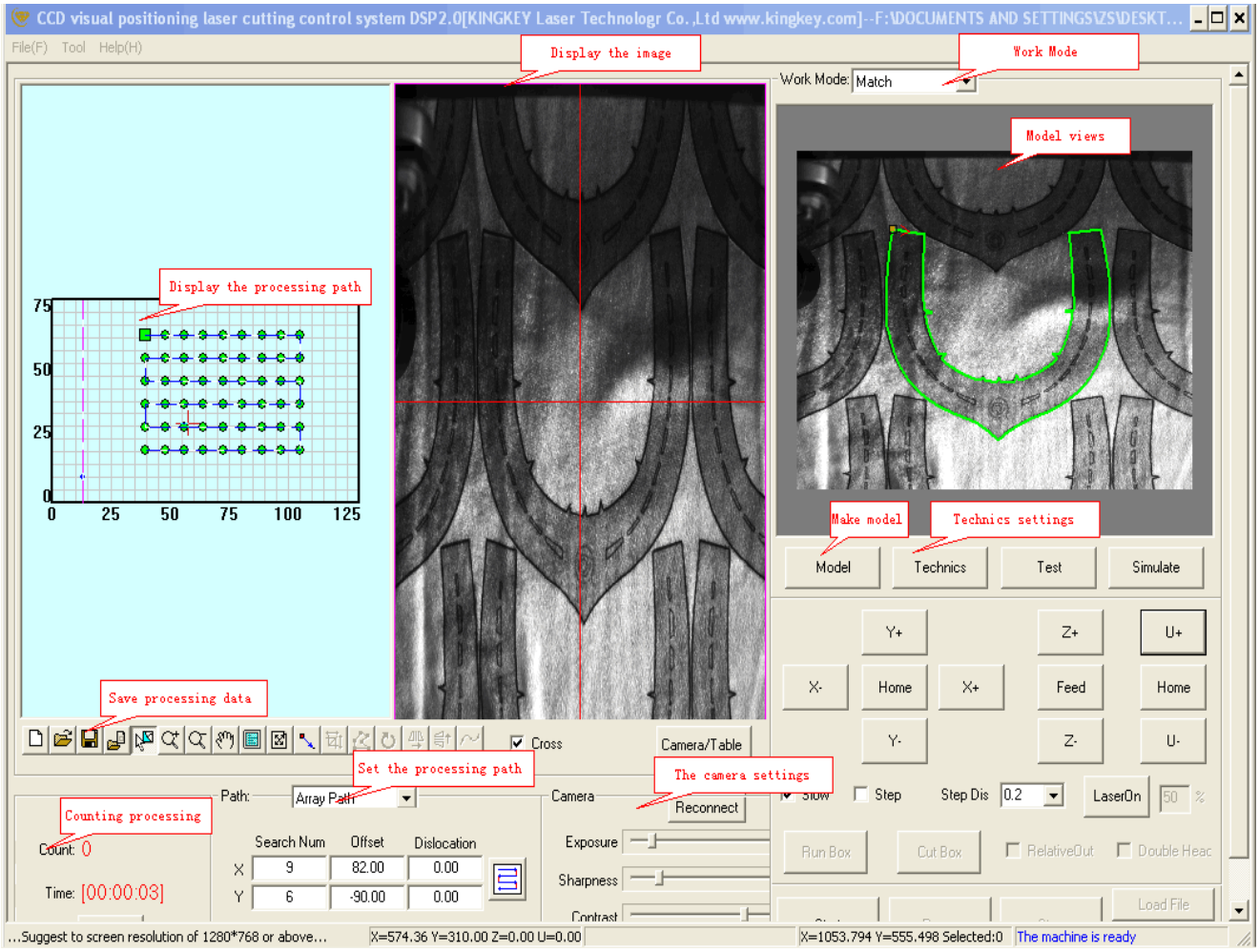
2 Advanced control system configuration instructions

2.1 Software Interface Overview

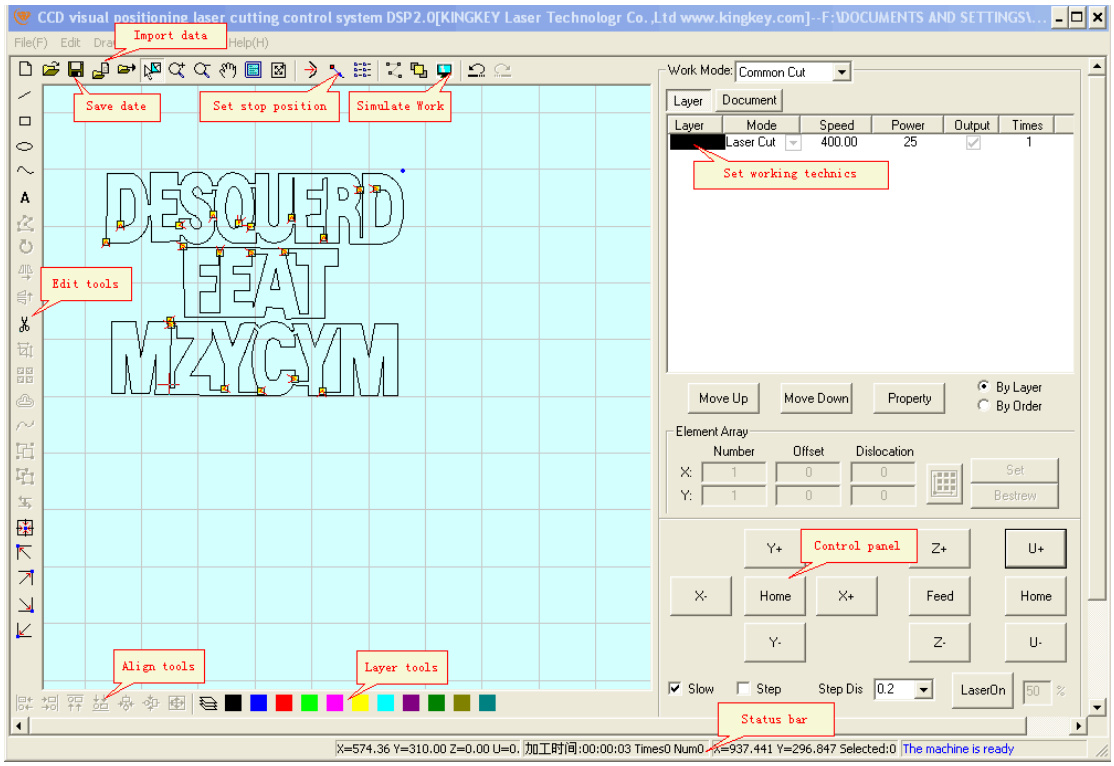
Click on 

the desktop application icon. Open control system software for the first time.

Work Mode: Match : Feature location, the interface as follows:



Work Mode : Common Cut : Normal cutting, the interface as follows:

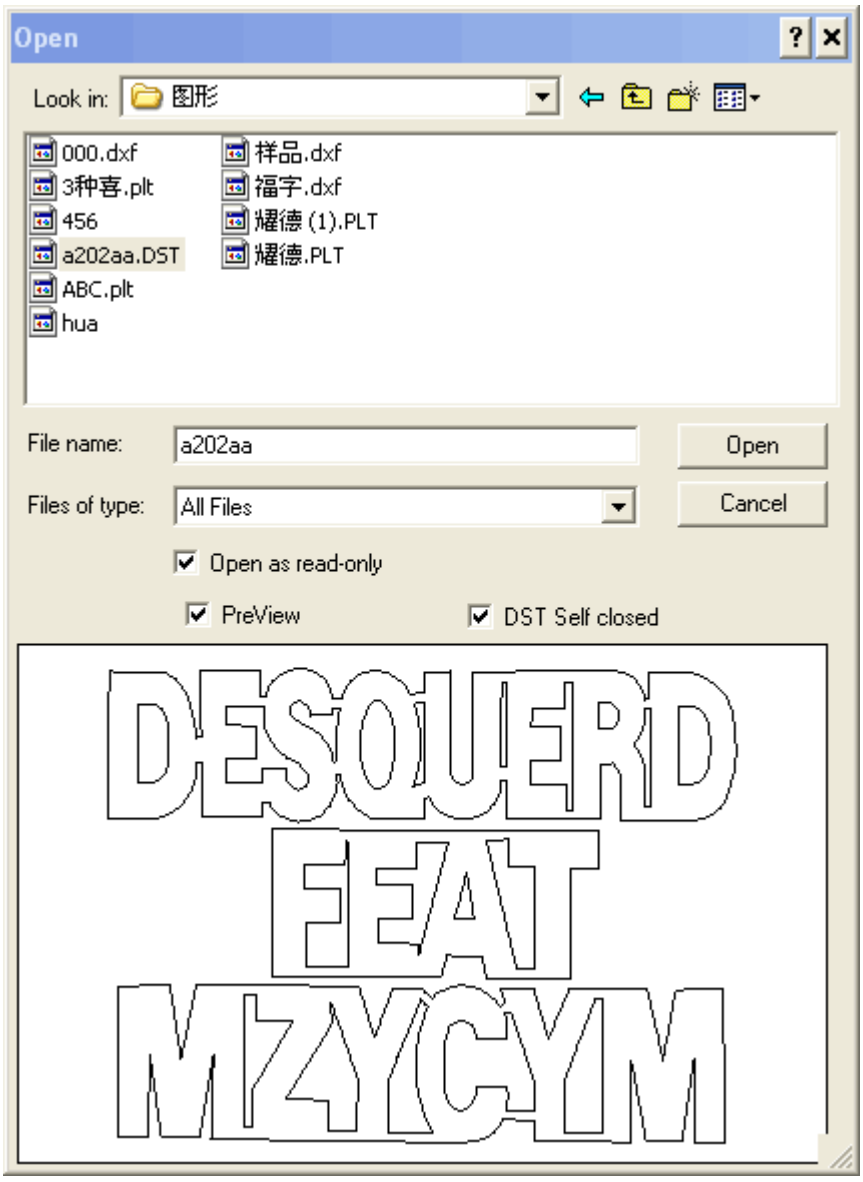


Place the mouse over the button to stop for a moment , then display the function of the button.

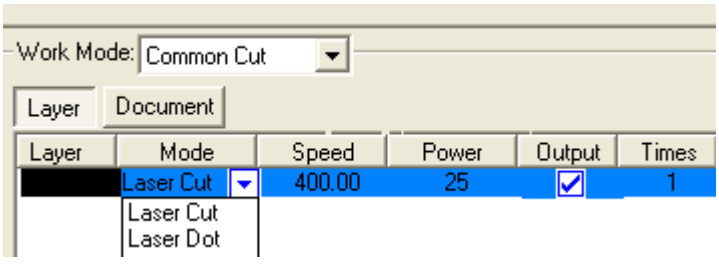
2.2 Common Cut

2.2.1 Import data

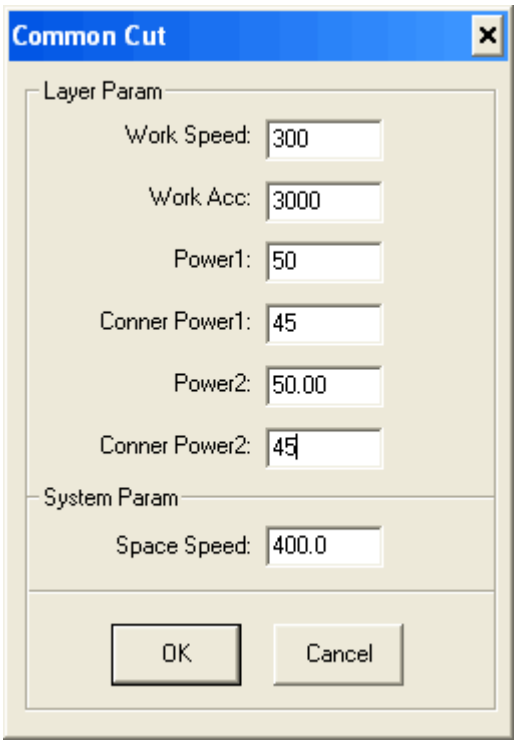
Click "  " or "**File (F)**" - "**Import Data**" to import data. Note that you can only import the file format supported by the system.



2.2.2 Set working technics



Select the process parameters in the mode drop - down menu. Double - click the color in the image above to enter the working parameters.



Adjust the “Work Speed” and “Power”. Click “**OK**”.

2.2.3 Load file

Click “ 

” to down load files. The system will be prompted to download is successful. When you download the data, you can name the file.

2.2.4 Work

Click “ 

” button on the software interface to start working;

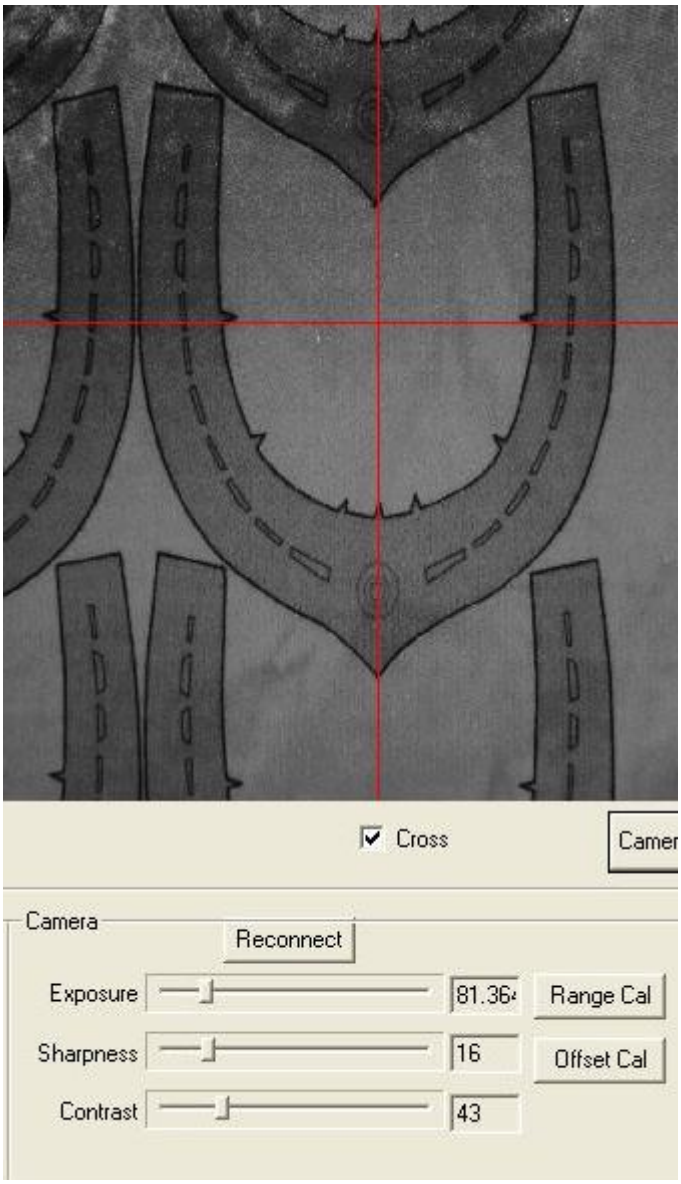
Click "**start**" button on the panel to start working;

Working can pause halfway;

After the end of the process, the system will alarm

2.3 Match

2.3.1 Set the camera



Reconnect: If you have clicked camera setting, the interface displays without graphics. You should click again to drive the CCD visual driver, until the image shows up.

Exposure: If you do not satisfy the image, you can use this function to improve the definition. The brightness recommended value of about 25. If the brightness value is too large, it will cause the camera to take a slow response.

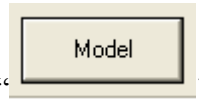
Sharpness: Manually adjust the sharpness value, can improve the definition better.

Contrast: Manually adjust the contrast value, can enhance the contrast of color difference, to

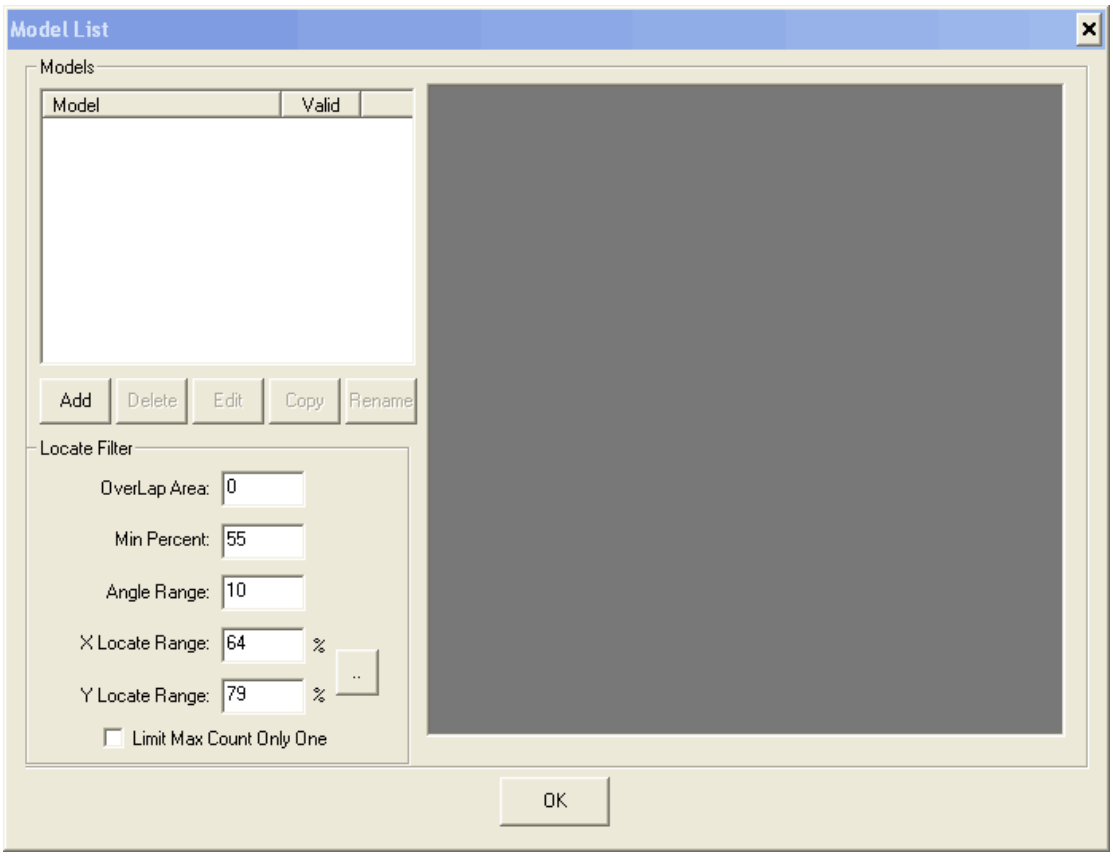
improve the recognition rate. The contrast value is recommended for more than 100.

2.3.2 Make model (Match)

2.3.2.1 Add new model

Click “ 

” button, the interface is as follows:



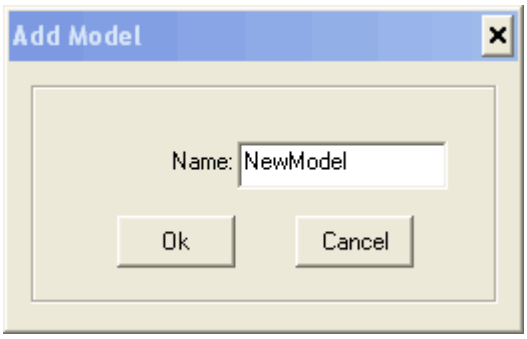
Over Lap Area: Theoretically, the cutting line does not overlap. The trademark is close to the mark, or the error of the cutting line identification leads to the overlap of the cutting line. If the overlap area is 0, the leakage will be filtered. Set reasonable overlap area to avoid leakage

Min Percent: Minimum similarity value represents the minimum similarity between the objects defined by the trademark and the template. The minimum similarity value is too large to be easily missed, too small to cause the object to be identified.

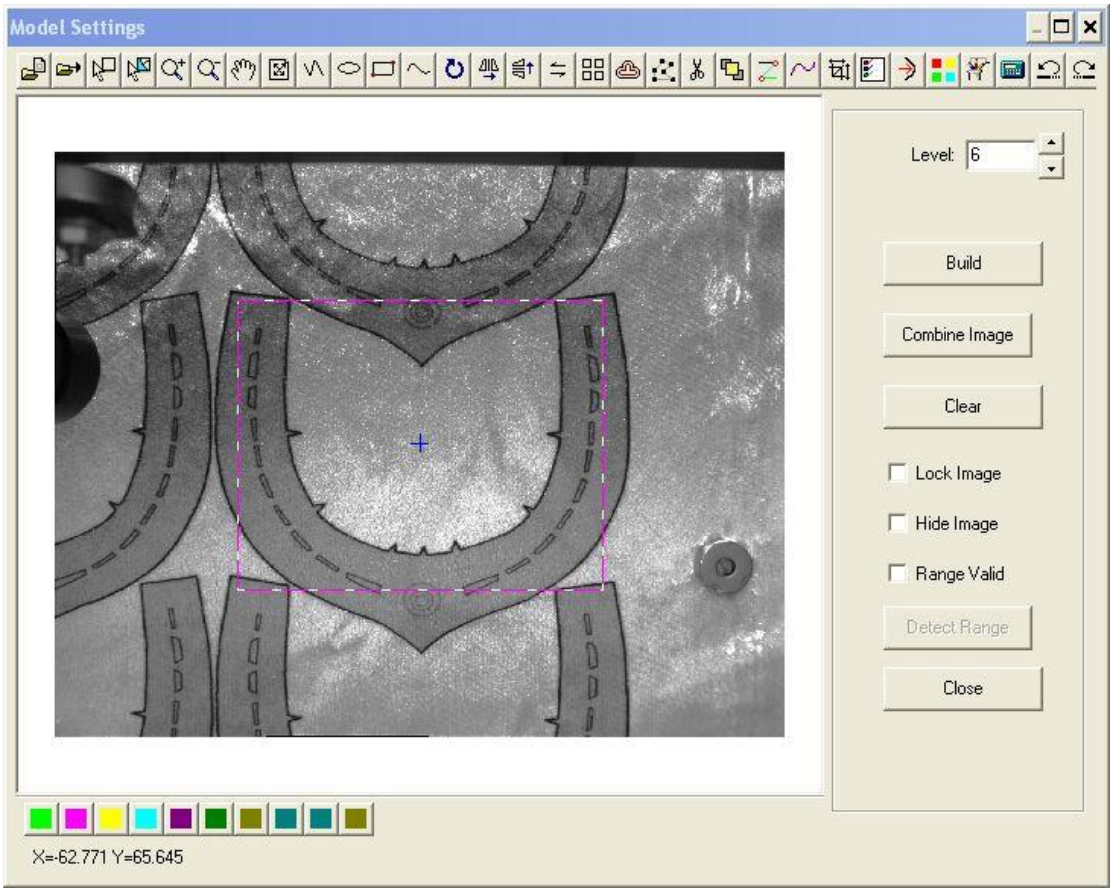
Angle Range: The maximum rotation angle of object and template when the angle range is allowed to recognize. The actual error relative to the template setting angle of the trademark, the equipment installation process has been configured to allow 30, plus or minus 30 degrees; set to support arbitrary angle 180 placed trademark, smaller values recognition faster.

X Locate Range and **Y Locate Range**: The central area of the camera is very small. In order to improve the accuracy of small trademarks, you can set the search scope to remove the edge of the large deformation of the object

Click "**add**" button to create a new model:



Click “**OK**” to enter the model settings interface:



Level: The level value can be modified, the higher the level value is, the faster the camera recognition is; The smaller the level value is, the lower the camera identification becomes, the recognition accuracy is improved.

Build: Click the "**Build**" button, the system automatically analyzes the image inside the dotted line, and generates a blue feature line.

Combine Image: Click "**Combine Image**" button, directly into the image mosaic interface. This button function is equivalent to icon "  ".

Clear: If the system recognizes the graphics frame, the graphics effect is not very ideality. You can click the "**clear**" button to re-define the characteristics.

Lock Image: Click the "**Lock Image**" button, all the images can be selected.

Hide Image: Click the "**Hide Image**" button, Can only display vector data, to facilitate the removal of clutter characteristic line.

2.3.2.2 Set model range

The icon on the corresponding toolbar is . When setting the scope of the template, the color difference on the image is more obvious.

2.3.2.3 Build

Click the "**Build**" button, the system automatically analyzes the image inside the dotted line, and generates a blue feature line.

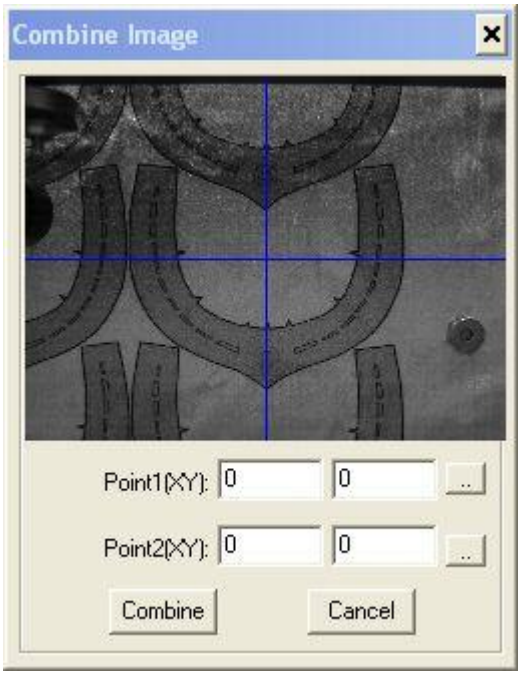
If the generated feature line is too cluttered, delete some unused feature lines.

If the feature definition line is not ideal, you can increase or decrease the "Level" value, re-click “Build” button to get the feature line.

2.3.2.4 Combine Image

If the camera is unable to capture a complete picture of the cutting object, you will need to use the "**Combine Image**" function.

Click the “**Combine Image**” button or “ ”button, there is the following interface:



Take the coordinates of two points. Click "Combine" button to scan the corresponding image.

2.3.2.5 Export Image

The icon on the corresponding toolbar is “  ”.

The current template images saved as a bitmap *.bmp format, easy to hook process graphics frame in CorelDraw.

2.3.2.6 Import Data

The icon on the corresponding toolbar is “  ”.

Import software support data, including: *.PLT, *.AI, *.DXF, *.DST, etc.

Common *.PLT under the hook to take the CorelDraw graphics, import to the graphics and the PLT vector border graphics and pictures of the border overlap.

Accurate moving graphics when holding down the CTRL key when every time up and down or so, the distance to move the graph 0.05mm; Press and hold down the CTRL+SHIFT key when each up and down , the distance to move the graph is 0.025mm.

2.3.2.6 Test

After the above steps, the template set is completed, click "**close**".

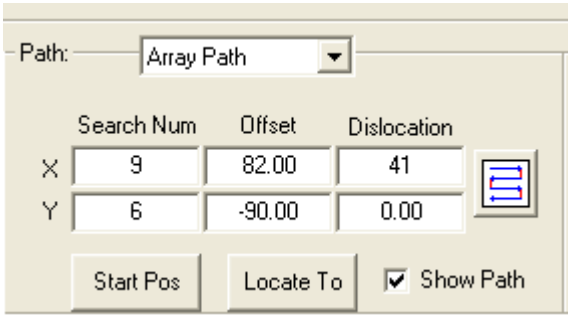
Back to the main interface, click "Test", try to cut a check that the model is set to correct.

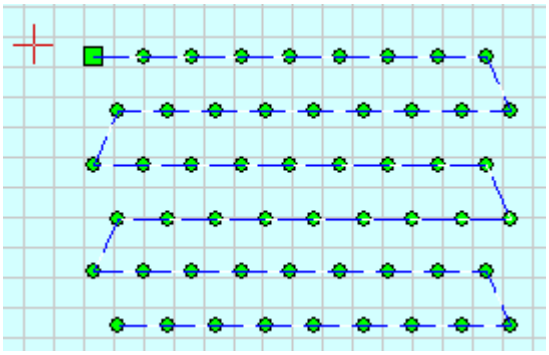
If you need to adjust the model, and then enter the "**Model"** interface, click "**Edit**" to adjust.

2.3.3 Set processing path

2.3.3.1 Array Path

The array path is used for the material to be arranged in a regular pattern, as follows:





Search Num : Enter the material on the XY direction to take pictures of the number of times.

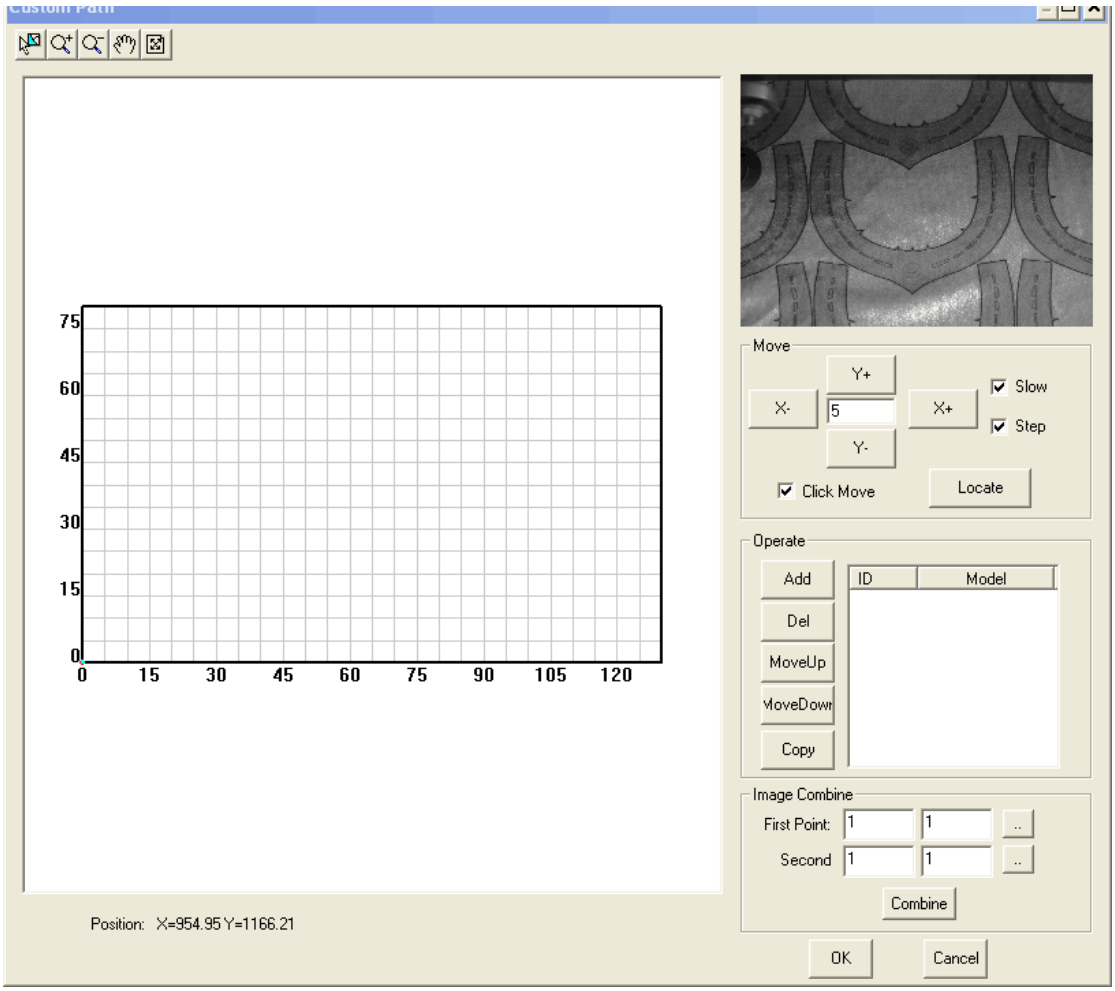
Offset: XY direction of each camera format offset distance. The spacing value needs to be used with a ruler, the unit is mm. Value can be positive and negative, "left" and "down" is negative, "right" "up" is a positive value.

Dislocation: Offset per line or per column. The value is generally half of the value of the pitch. Sometimes there are special circumstances, need to use a ruler to measure the offset value.

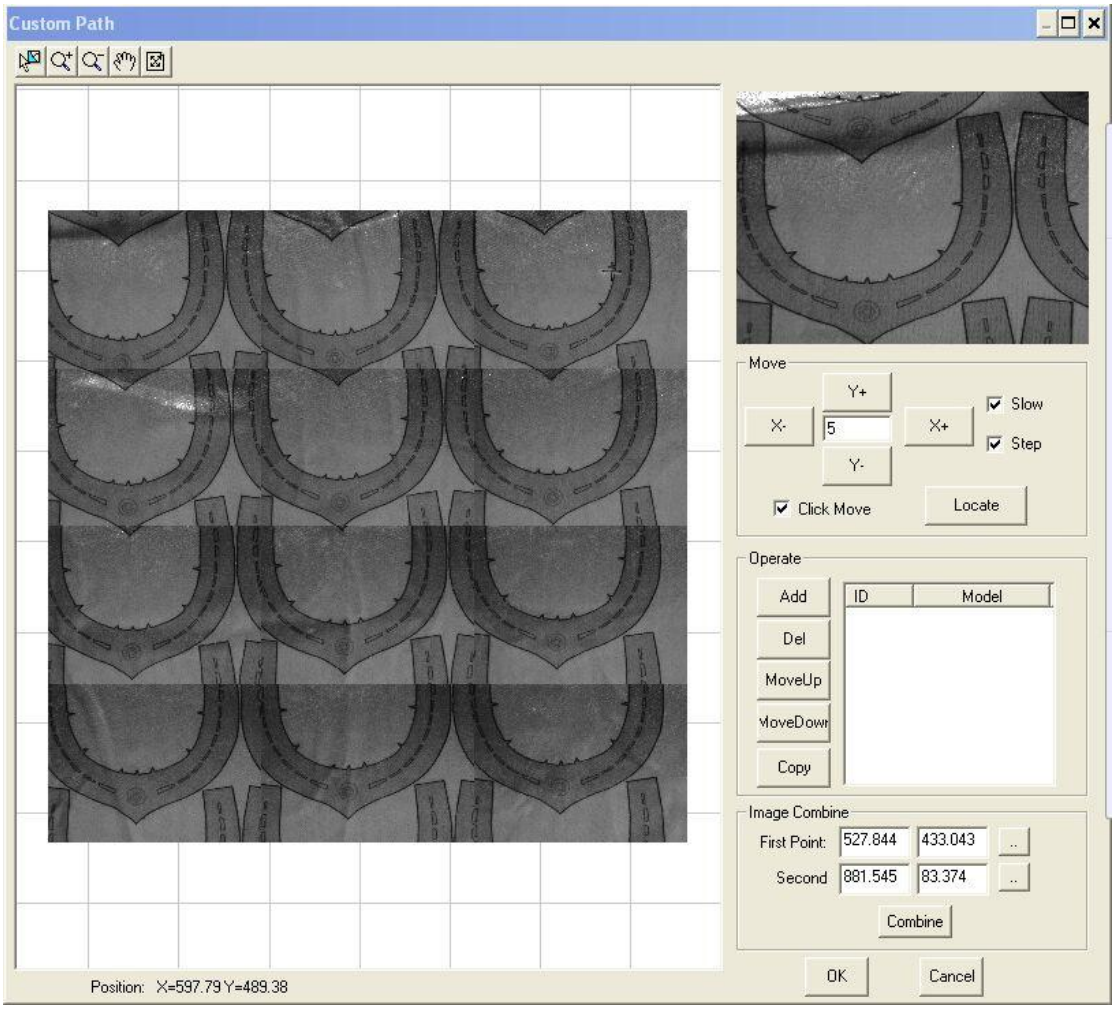
 : There are four path modes available. Choice is the "X direction priority" or "Y to the priority"; whether to take the S shape.

2.3.3.2 Custom Path

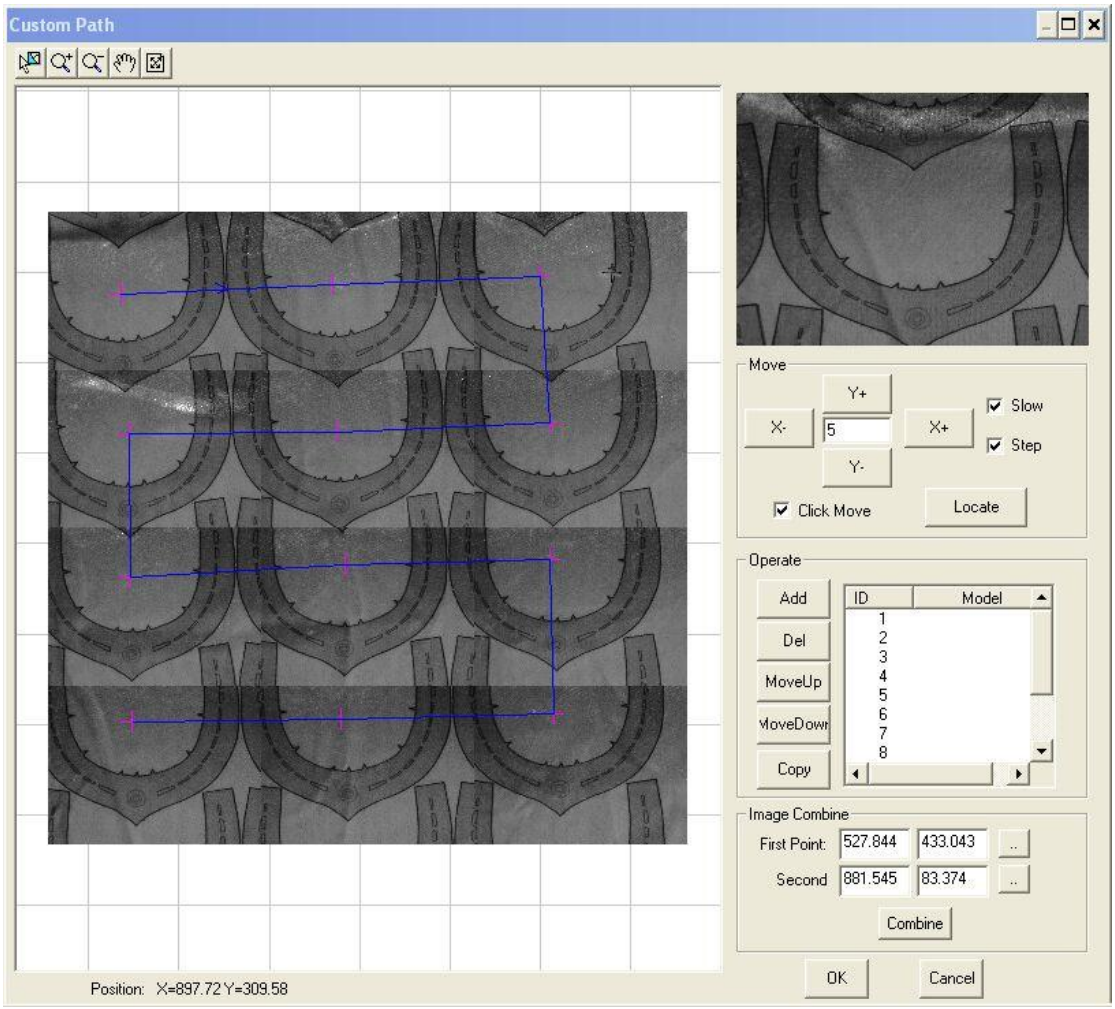
In the irregular arrangement of materials, the use of "custom path" mode:



"**Image Combine**": Scanning mosaic of full page materials, as shown below:



Point "**Add**", you can increase the location of the point of taking pictures, each of the red cross that is the point of the camera to take pictures. As follows:

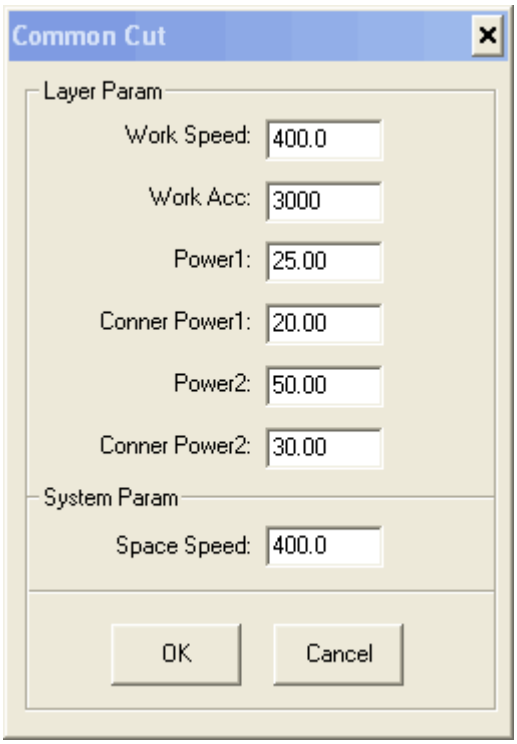


Each "Red Cross" can be edited. Can remove the "**up**" and "**down**" "**copy**" operation. Each point of the template can choose a different template.

After editing, click "**OK**" to complete the path settings

2.3.4 Technics settings

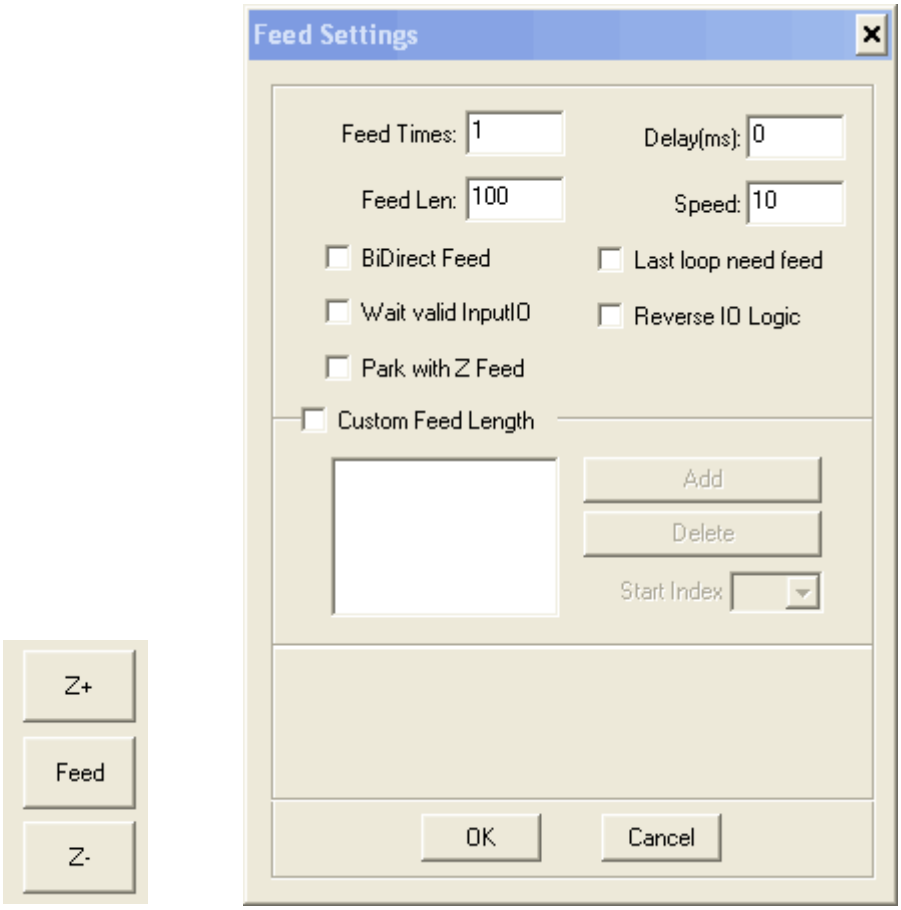
Click "  " to enter the following interface:



Confirm the "**Work speed**" and "**Work Acc**", "**Power**" and then click "OK".

If the "**automatic feeding**" machine, click " 

", can be set to repeat cutting feeding frequency and feeding length and other parameters. As follows



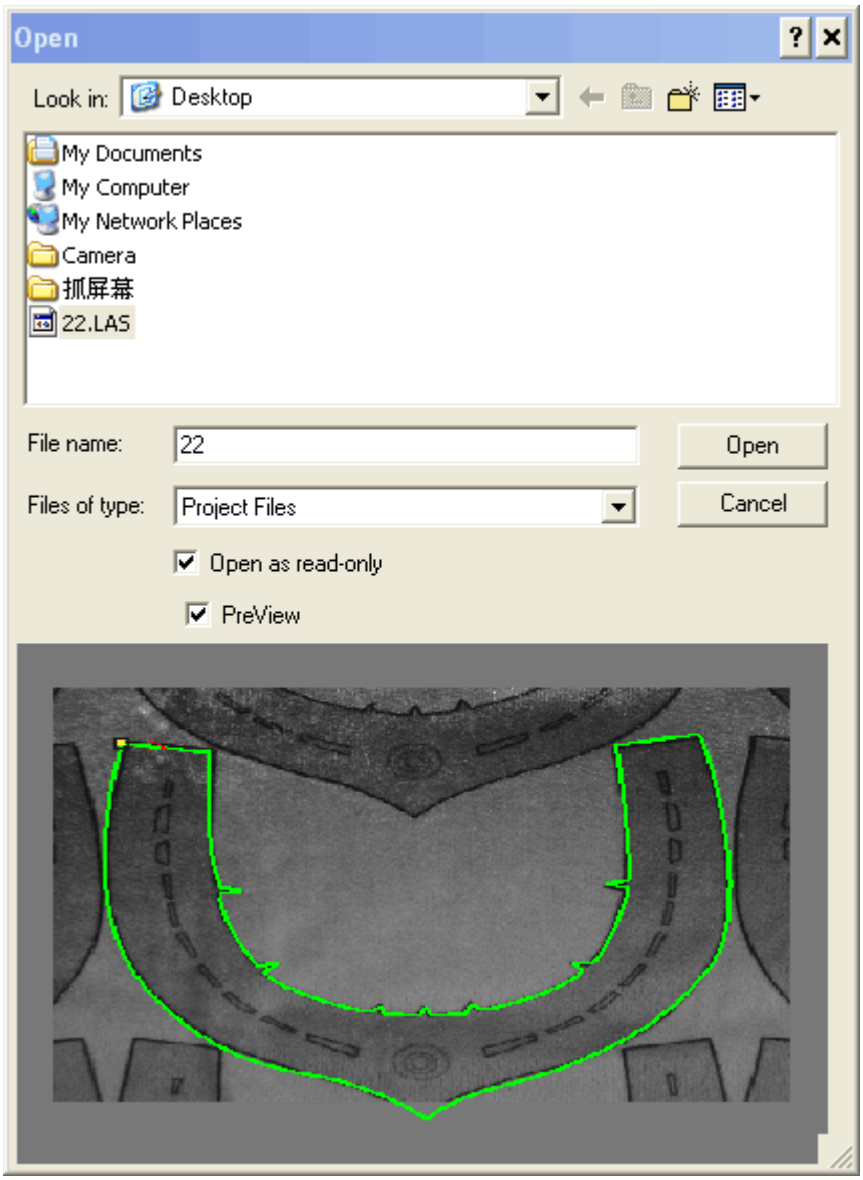
Set the corresponding "**Feeding Times**", "**Delay**", "**Feed Length**", "**Speed**" value.

2.3.5 Save Data

After the template is confirmed, click the save, save the project file, then you can open the project file to repeat working.

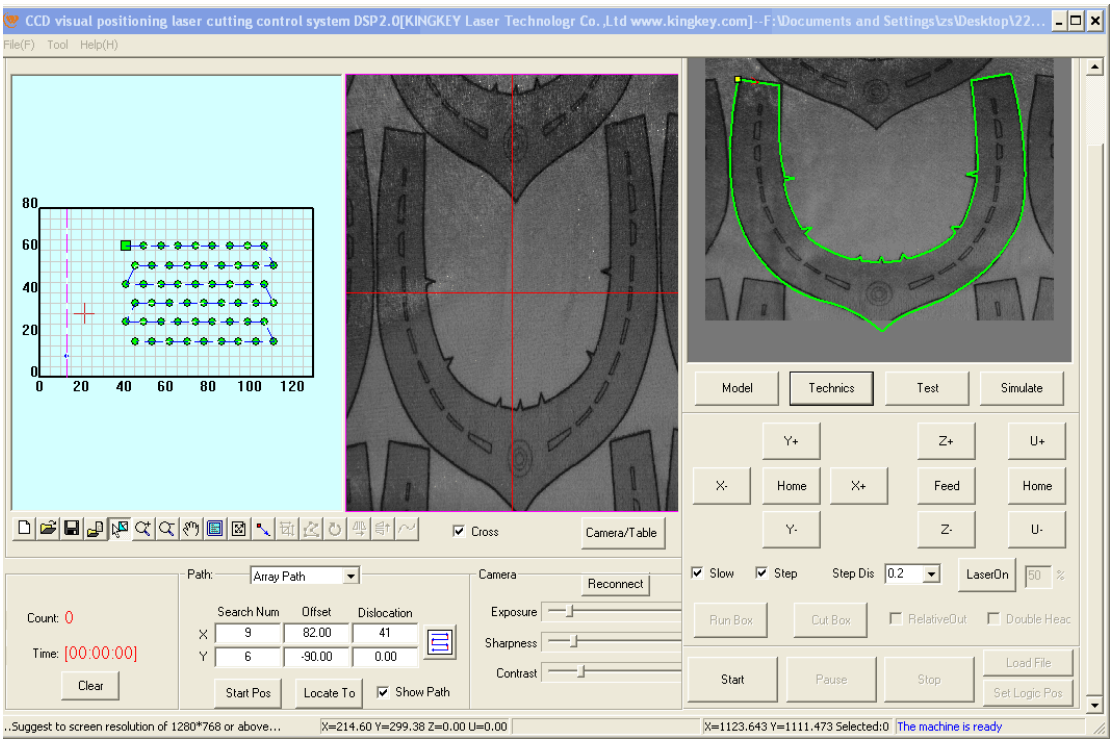
Click "  " button to save the specified folder, to facilitate the next open

Click on the "  " button, you can open the template file saved in the past , graphics can be preview, convenient and quickly find the desired project file. As follows:



2.3.6 Working

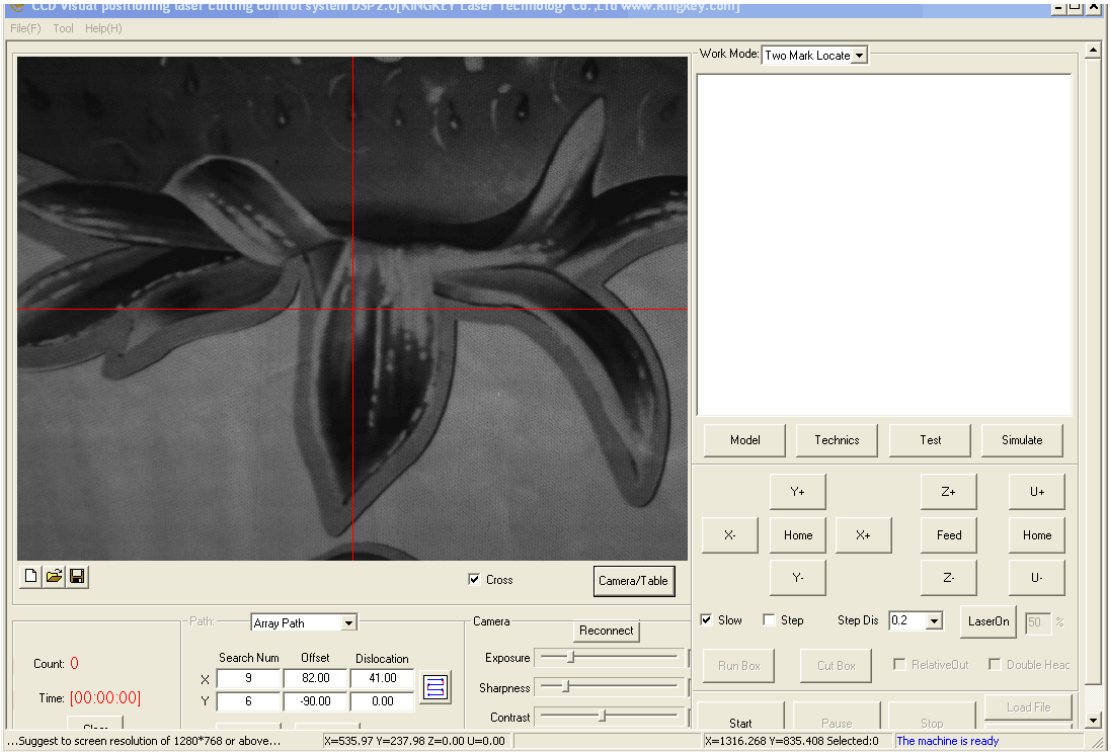
Move the laser head to the starting position and click "**Start**" for working.



2.4 Two Mark Locate

"**Two Mark Locate**" is generally used for the cutting of large trademark graphics. Its operation method and "**Match**" working mode only have different in the "**Model**".

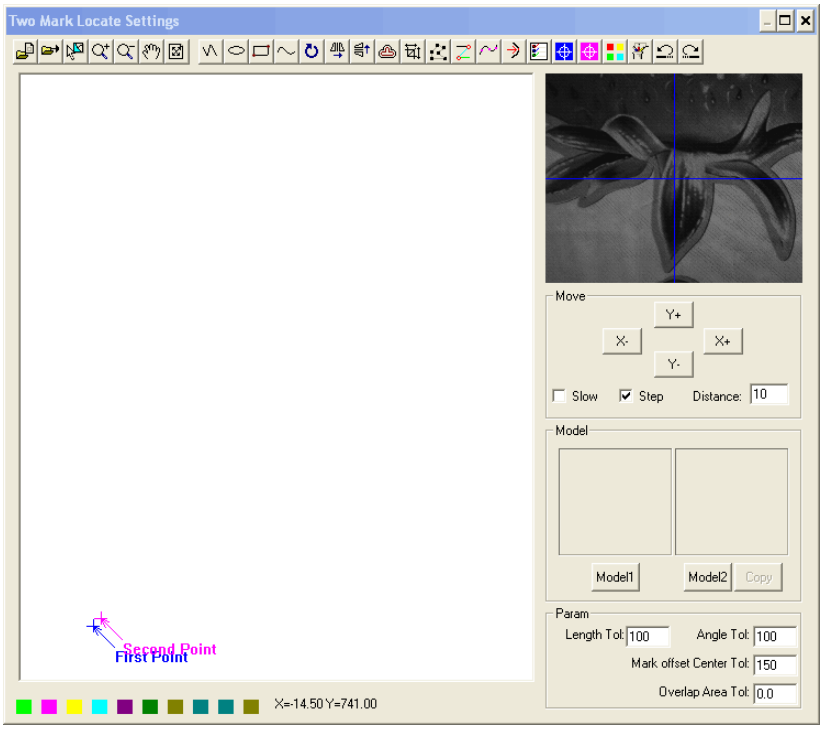
Click on the "**File (F)**" - "**Machine Settings**" - "**vision Set**", "**Work Mode**" to "**Two Mark Locate**", restart the software, there are the following interface:



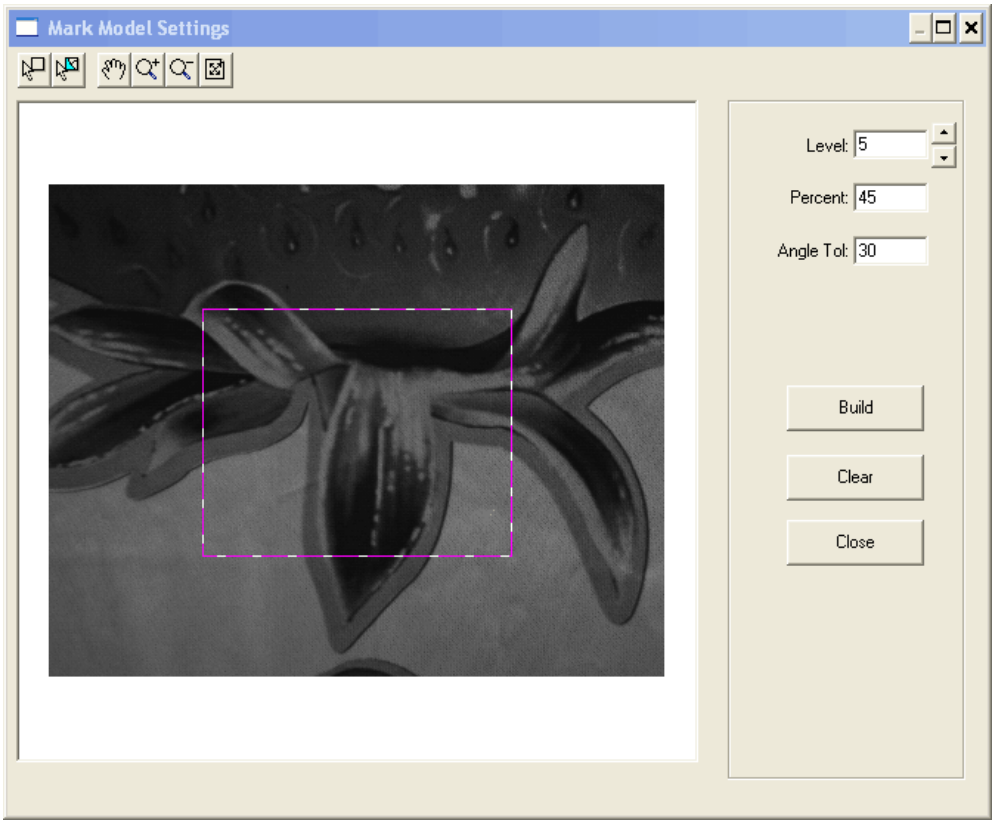
2.4.1 Model (Two Mark Locate)

1, click on the " 

" button, there are the following inter face:

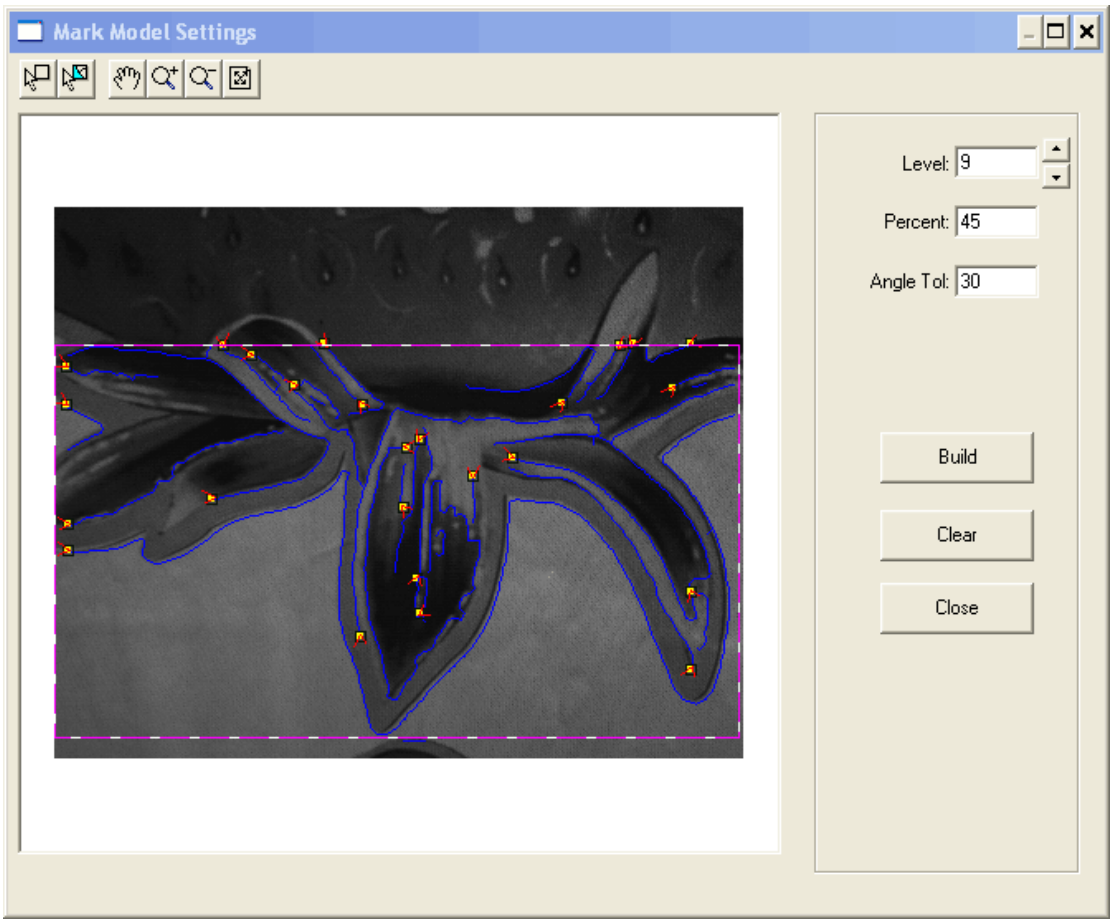


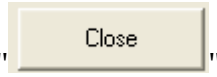
Click "**Model1**", as follows:

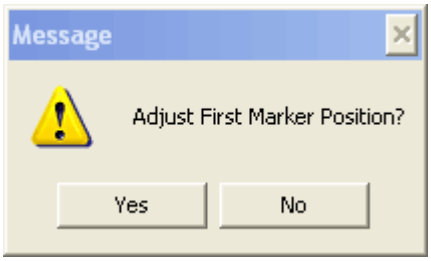


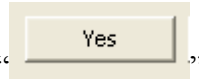
Click "  ", according to " 

", as follows:

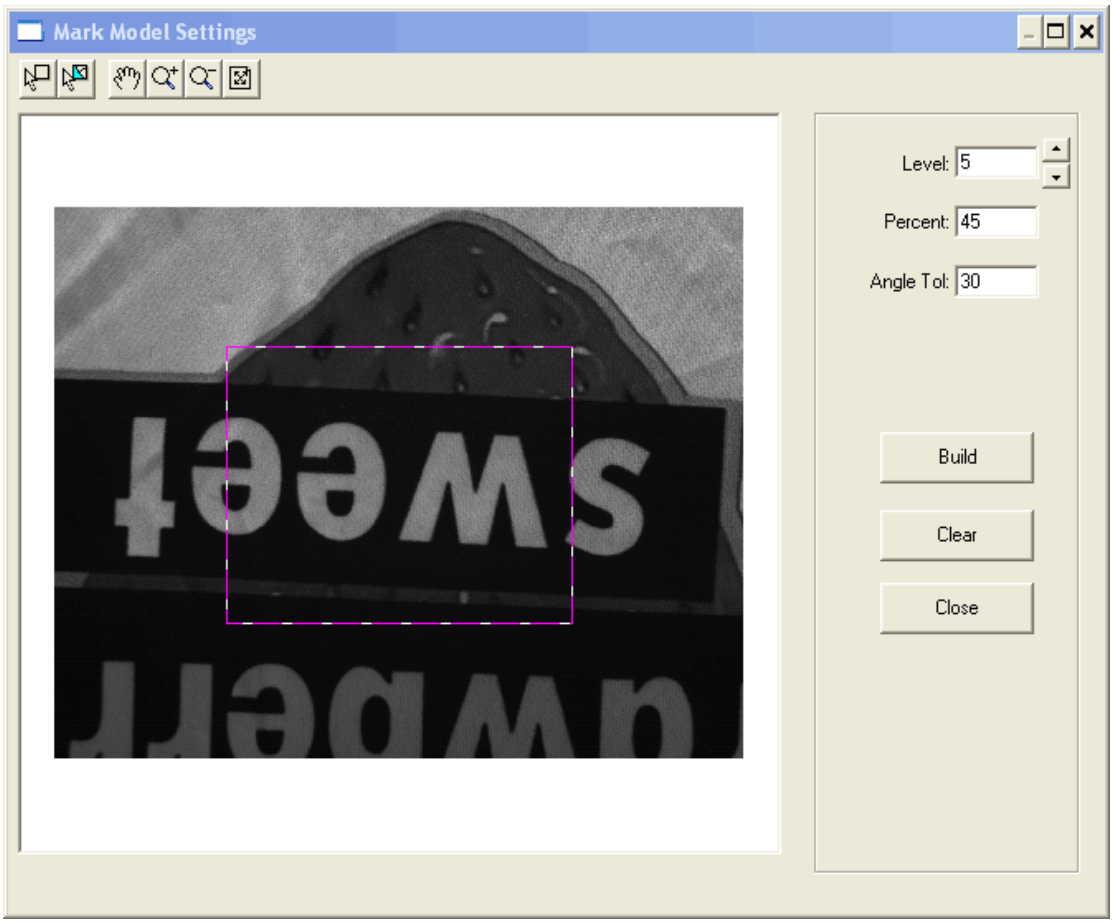


Click "  " button, as follows:



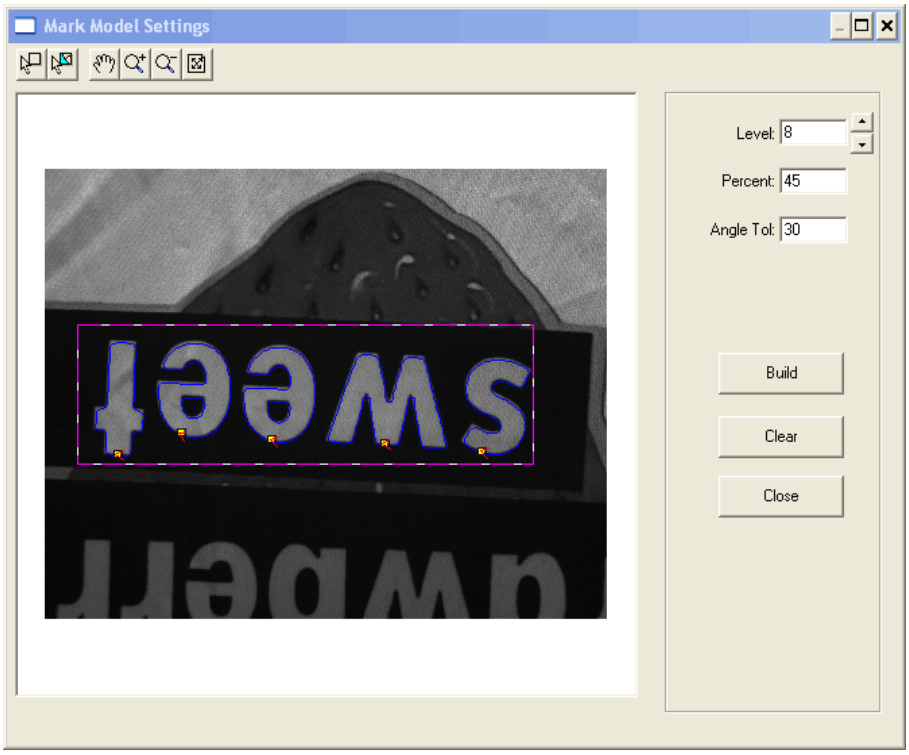
Click "  " button.

Click "  ", as follows:



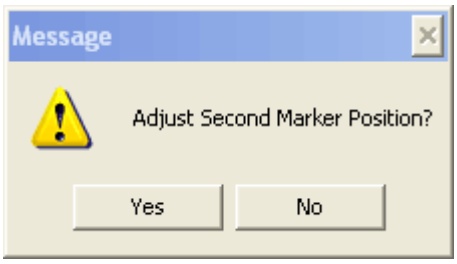
Click "  "- " 

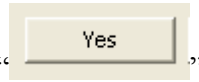
", as follows:



Click " 

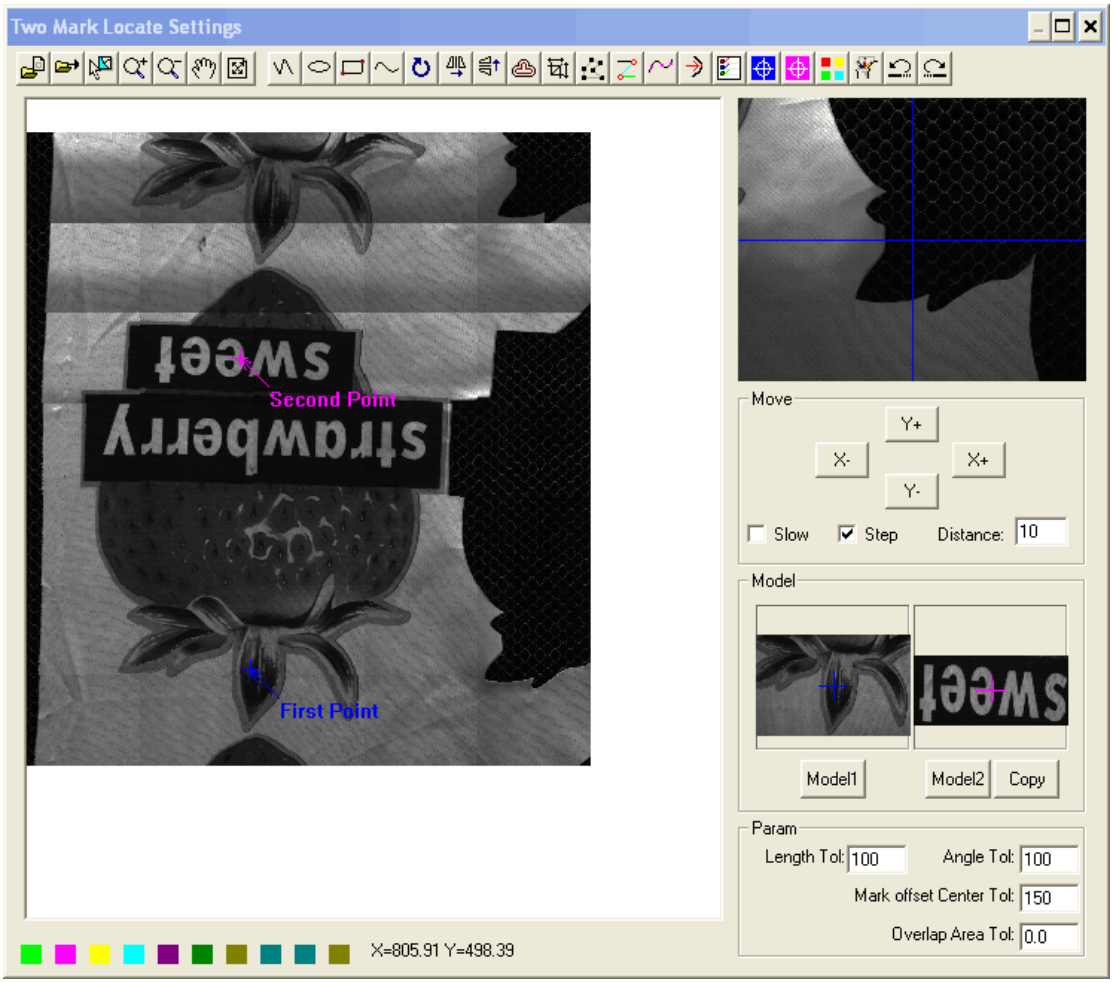
" button, as follows:



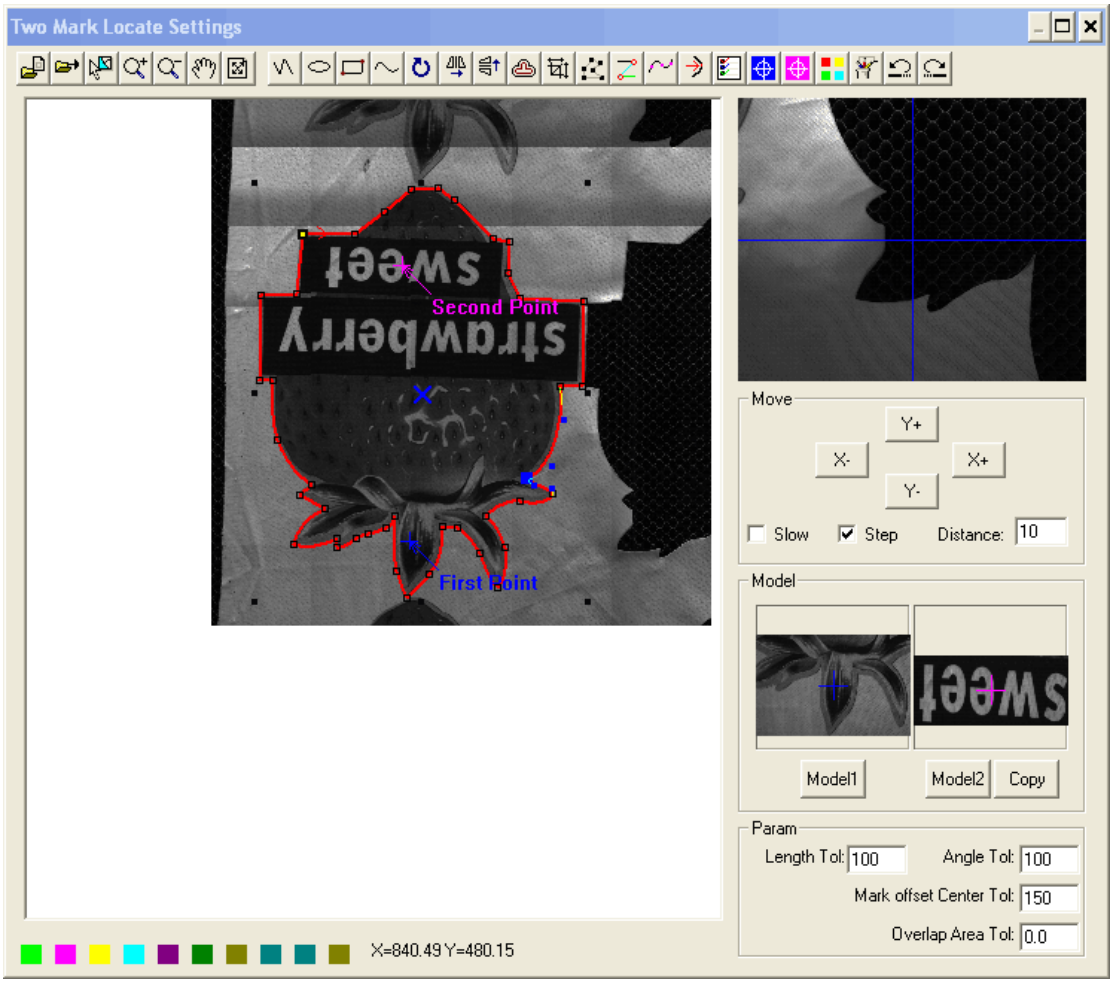
Click " 

" button.

2 , Click "  " button, as follow:



3, click on the "  " button, there are the follow:



Length Tol: Length tolerance. Graphics allow for the size and size of the tolerances.

Angle Tol: Material allows for a range of angles to be placed.

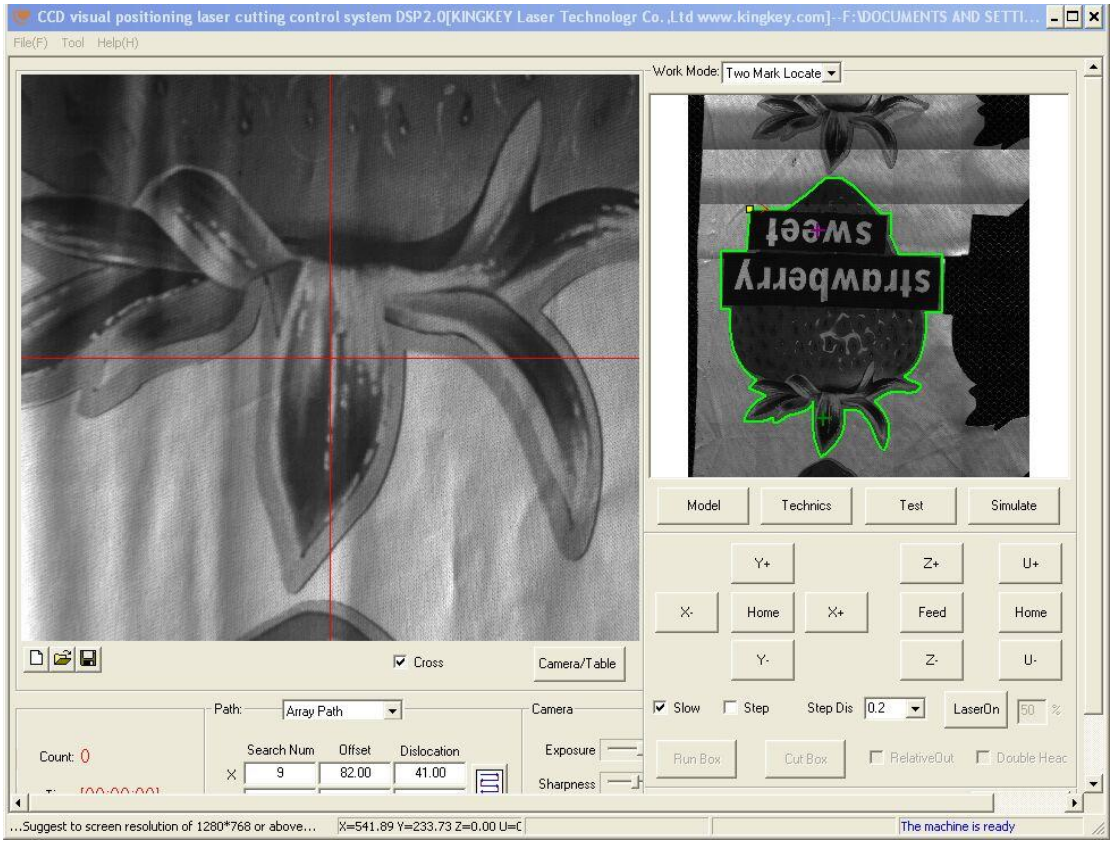
Mark offset Center Tol: Mark point allowed deviation from image center range.

Overlap Area Tol: Allows overlapping area between 2 graphs.

After the above parameters are set, click “**close**”. Model setup completed.

2.4.2 Test (Two Mark Locate)

Move the camera to the "**first point**", as shown in figure:



Click "**Test**", try to cut a check that the model is set to correct.

If you need to adjust the model, and then enter the "**Model**" interface, click "**Edit**" to adjust.

2.4.3 Set processing path (Two Mark Locate)

The same as the "**set processing path**" of "**Match**"

2.4.4 Technics settings (Two Mark Locate)

The same as the "**technics settings**" of "**Match**"

2.4.5 Save Data (Two Mark Locate)

The same as the "**Save Data**" of "**Match**"

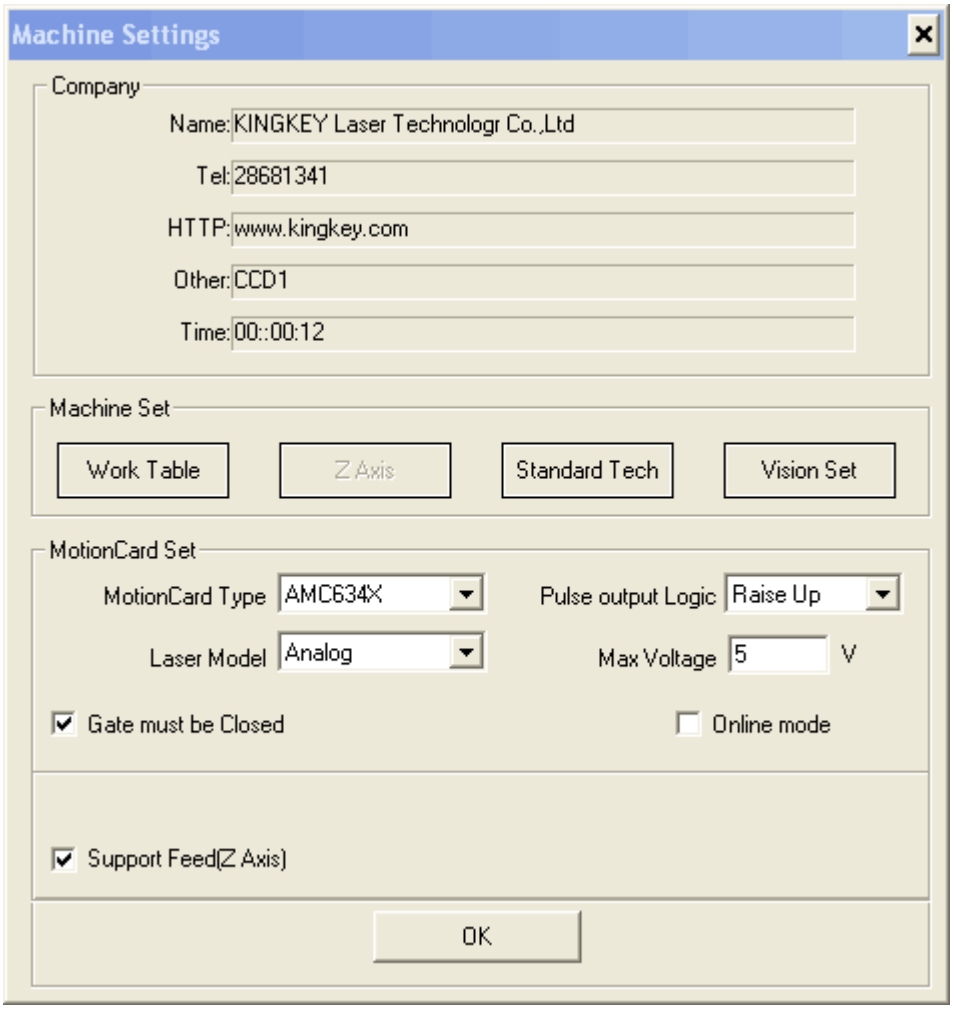
2.4.6 Working

The same as the "**Working**" of "**Match**"

3 Advanced configuration instructions

3.1 Machine settings

Click the "**File (F)**" menu under the "**Machine Settings**" will appear in the following dialog box.



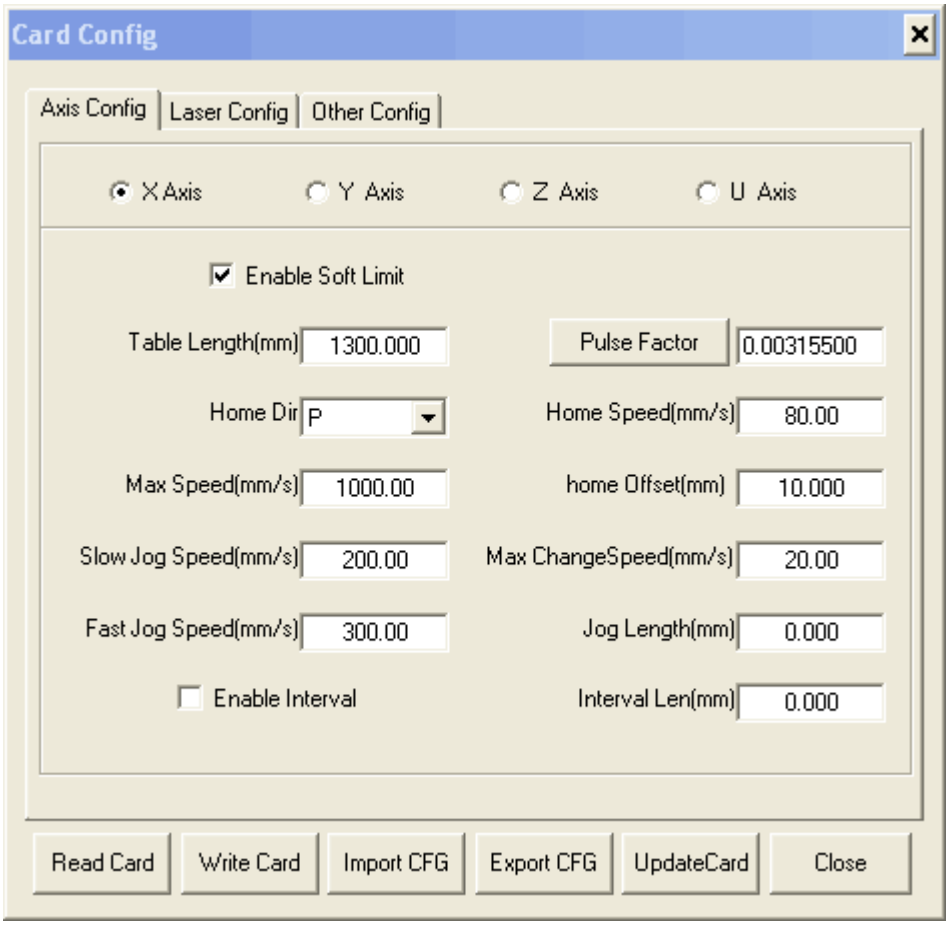
3.2 Company

This column provides basic information about vendors.

3.3 Machine parameter setting

3.3.1 Work Table

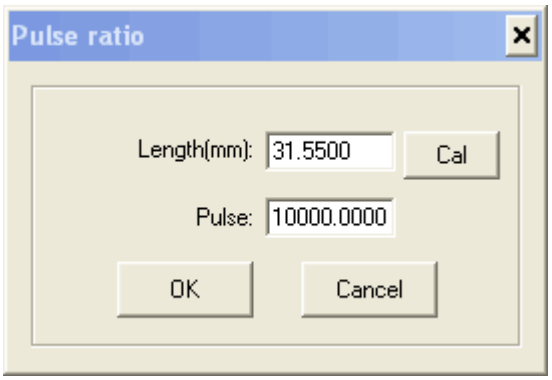
Open the software "**File (F)**" - "**Machine Settings**" - "**Work Table**", the interface is as follows:



Axis Config: Machine configuration. Set XYZU axis parameters. The X axis represents the lateral axis, Y represents the longitudinal axis, the Z represents the feed shaft, and the U represents the double headed mutual moving axis;

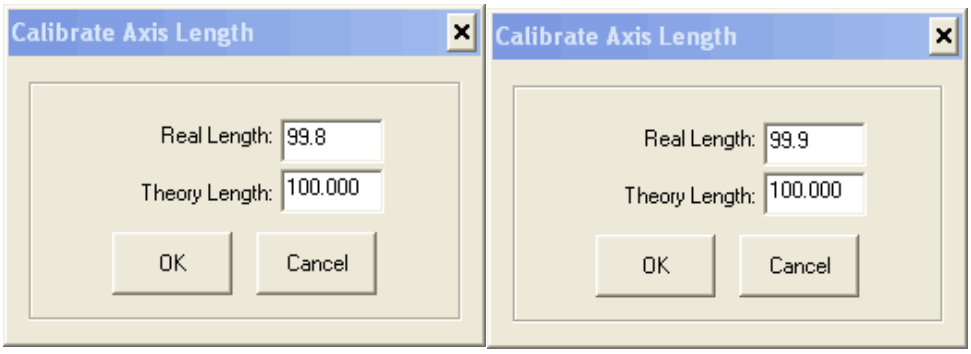
Table Length (mm): Format represents the maximum axis value of the moving range of motion. If more than the face value, the system will automatically alarm to prevent improper operation and cause the machine to hit the machine;

Pulse Factor: The control system sends a pulse laser head to move the distance. Click the button to appear the following dialog box:



Above 31.5500 indicates that the distance between the motor and the laser head is 31.55mm. 10000 indicate that the stepper motor requires 10000 pulses per revolution;

Cal: This function is used to calculate the pulse equivalent. If the processing out of the graphics, by measuring the size of the theory is not the same, you need to click on the "**Cal**", to re calculate the pulse equivalent. Such as: ordinary cut a rectangular 100mm*100mm, the actual size of the processing is 99.8mm*99.9mm, click on " **Cal** ", X, Y axis respectively fill in the value adjustment, as follows:



Click “**OK**”, then click “ Write Card ”. If it is not accurate enough, repeat the above steps to adjust the appropriate pulse equivalent;

Home Dir: Set the direction back to the origin. The right side of the X axis is positive, and the top of the Y axis is positive. You must ensure that the installation position of the origin switch corresponds to the setting of this option;

Home Speed (mm/s): Boot back to the origin of the speed. This value should not be more than 100mm/s. Otherwise it is possible to damage the origin of the switch and the larger;

Max Speed (mm/s): Maximum speed of machine operation;

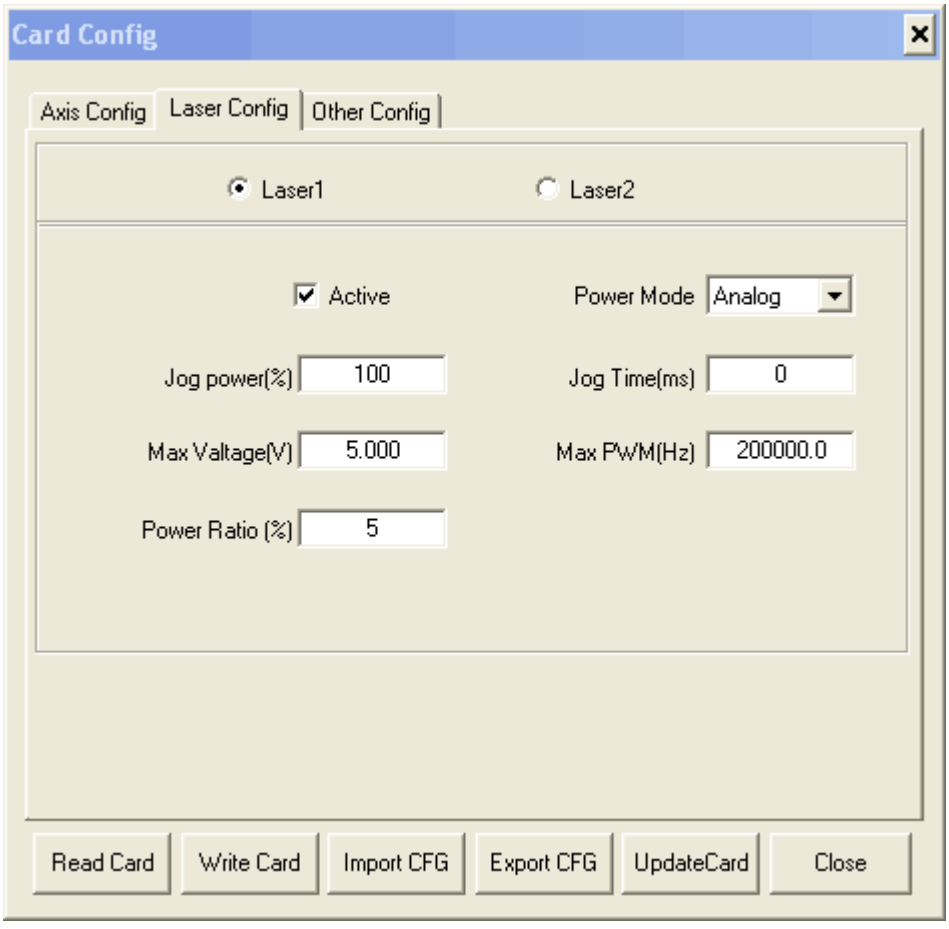
Home Offset (mm/s): The origin of rollback distance;

Slow Jog Speed (mm/s): Select “ Power On Home ”, the speed of the manual moving laser head;

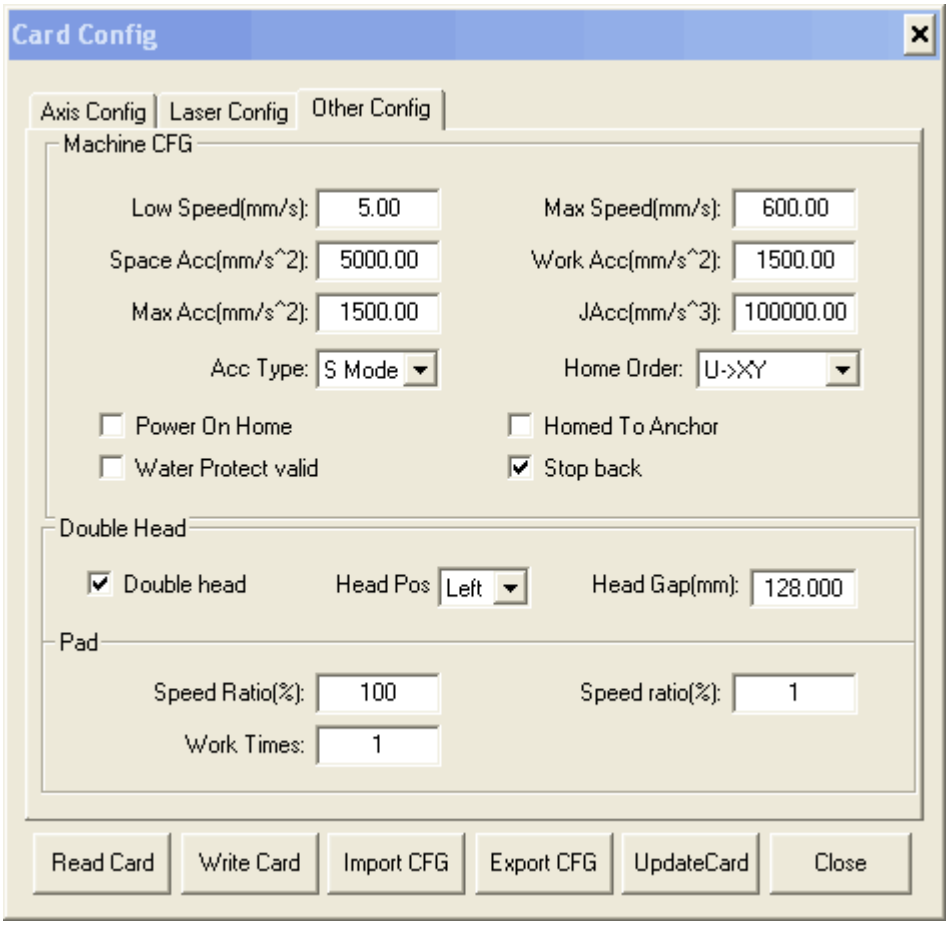
Fast Jog Speed (mm/s): Select “ Power On Home ”, the speed of the manual moving laser head;

Max Change Speed (mm/s): This parameter should not be too large to prevent the speed change too fast machine jitter;

Laser Config: Select the laser mode, with "analog" and "PWM" two:



Other Config：Machine motion parameters, as shown below：



Low Speed (mm/s): Initial velocity of Y and X axis motion. This value is too large to cause the machine to run larger vibration;

Max Speed (mm/s): Maximum speed limit for Y and X axis motion;

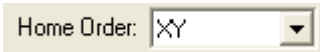
Space Acc (mm/s^2): X, Y axis is not the acceleration of the motion of the light space, according to the specific machine to set the match of the acceleration;

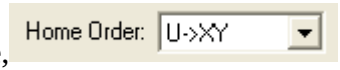
Work Acc (mm/s^2): X, Y axis cutting acceleration, according to the specific machine to set the match of the acceleration;

Max Acc (mm/s^2): Used to control the speed of the turning;

J Acc (mm/s^3): X, Y axis cutting acceleration of the acceleration, the value is generally set to 100000-200000;

Home Order: Machine axis back to the origin of the order of choice, the user can customize;

Two axis machine, 

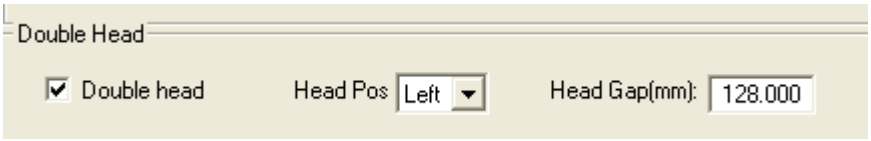
Double head mutual transfer machine, 

Power on Home: Whether to enable back to the origin;

Water Protect valid: Whether to enable the water protection function;

Double head: With the help of the "left" or "right", the actual mechanical structure of the machine can be selected. ***Note: if the machine does not support the double headed cross axis, "*** 

" in front of the box do not tick, otherwise, the machine is not working properly;



Read Card: Debug the system parameters of the card, reinstall the software, can be read directly.

Write Card: Write machine parameter to control card.

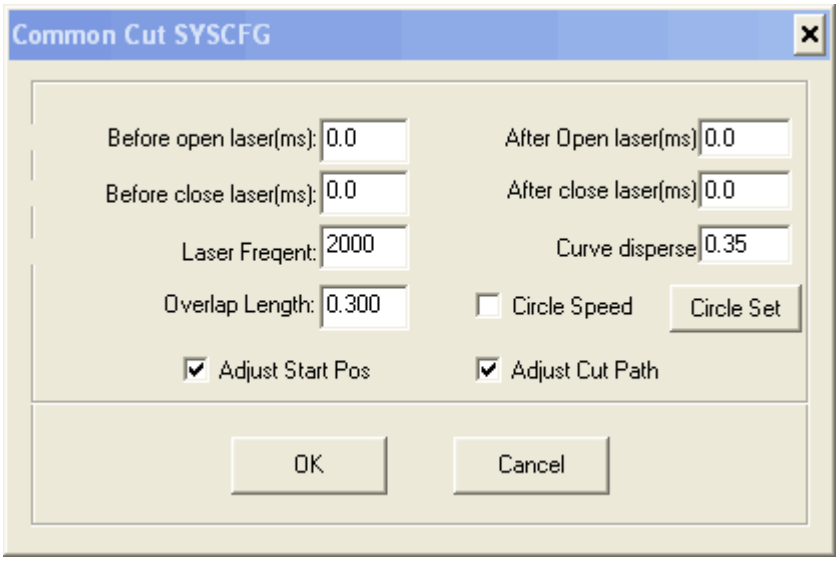
Import CFG: Import the machine parameter file into the software on the computer.

Export CFG: Backup machine CFG.

Update Card: System upgrade. The specific operation method reference to "AMC6340X upgrade instructions".

3.3.2 Standard Tech

This parameter setting parameters influence the effect of cutting speed and small. As follows:

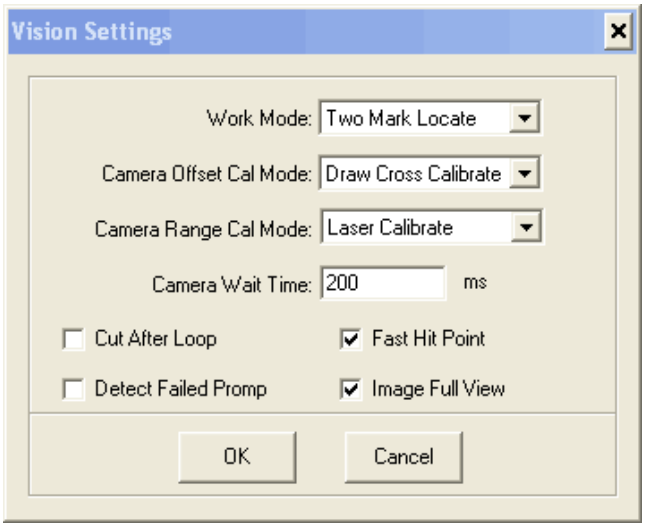


Circle Speed: Users can choose whether to enable the speed limit function. Click " Circle Speed " can set the speed of different sizes, depending on the actual situation of the user to adjust the parameters

Adjust Start Pos: After the opening of the pen cutting positions of a plurality of primitives in accordance with the nearest point pen cutting; if it is not enabled, by cutting the original graphic pen position. It is suggested that this feature can be enabled to improve the cutting efficiency

3.3.3 Vision Set

About camera setting parameters, as follows:



Work Mode: Visual cutting can be divided into two types: Match and Two Mark Locate.

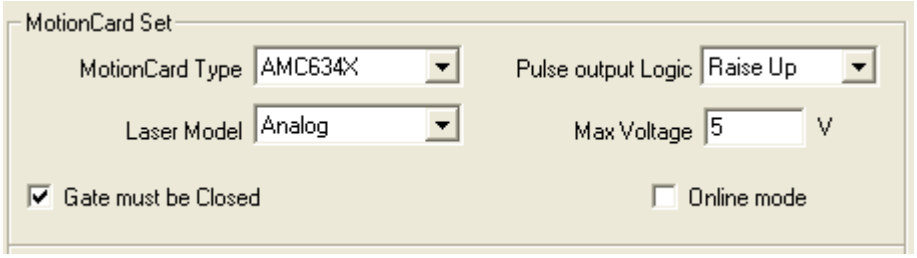
Camera Offset Cal Mode: Draw Cross Calibrate and Detect Contour Calibrate. The default choice of the general situation is Draw Cross Calibrate.

Camera Wait Time: Numerical proposal 200.

Cut After Loop: First scan after cutting.

Detect Failed Promp: Check this, if the system is not identified, the software prompts the alarm.

3.4 Motion Card Set



Motion Card Type: According to the actual use of the manufacturers control card type to select the appropriate control card. Under normal circumstances there are GES400 and AWC634X.

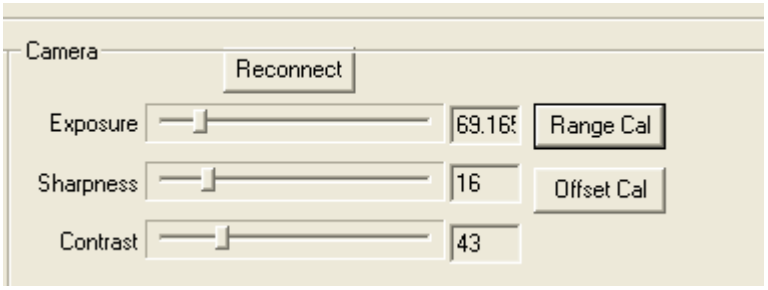
Pulse output Logic: The impact of repeated precision, according to manufacturers to provide manufacturers with the choice of models.

4 Range calibration and offset calibration

4.1 Range calibration

Range calibration is the most important part of the system, which directly affects the accuracy of the cutting system. Before the calibration of the range, be sure to ensure that the machine movement is normal and the laser is normal. Prepare A4 white paper.

The interface is as follows:

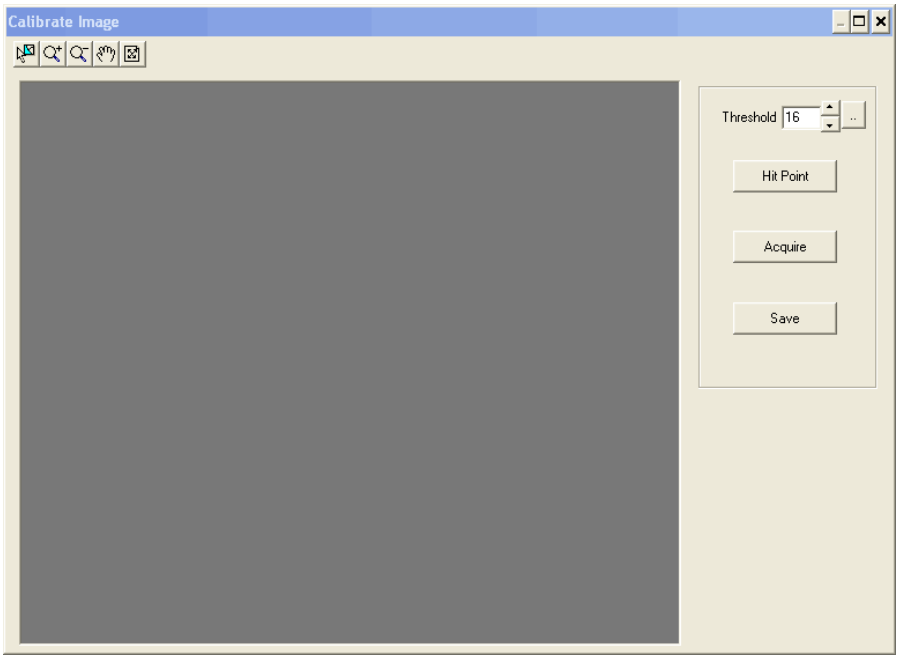


Adjust the lens, to ensure the camera to take pictures clearly:

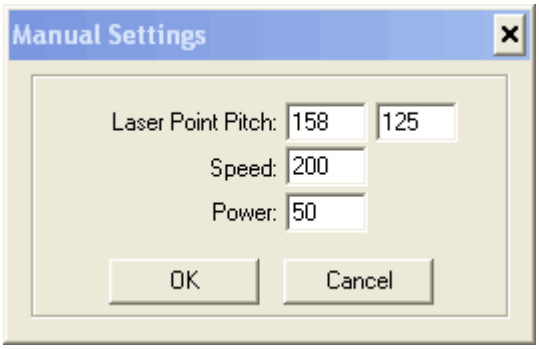
Computer8MM lens: on the ring to adjust brightness, under the ring focusing lens;

CCTV6-12MM: ring adjustable camera format, the middle circle adjust brightness, adjust the focal length under section ring

Click "**Range Cal**" button, there are the following interface:



Click "**Hit Point**", there are the following interface:



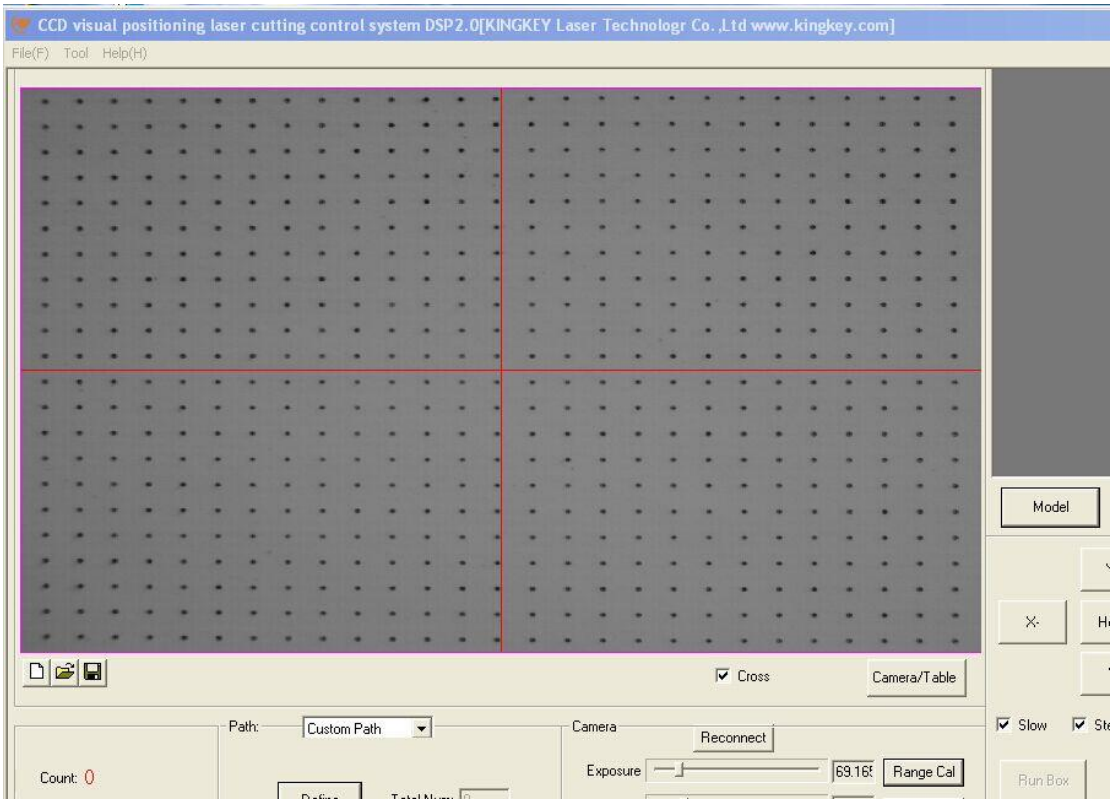
Laser Point Pitch: Refers to the size of the camera in the X, Y axis two directions, unit mm. This range is slightly smaller than the range of the camera exposure 2-3mm.

Speed: working speed.

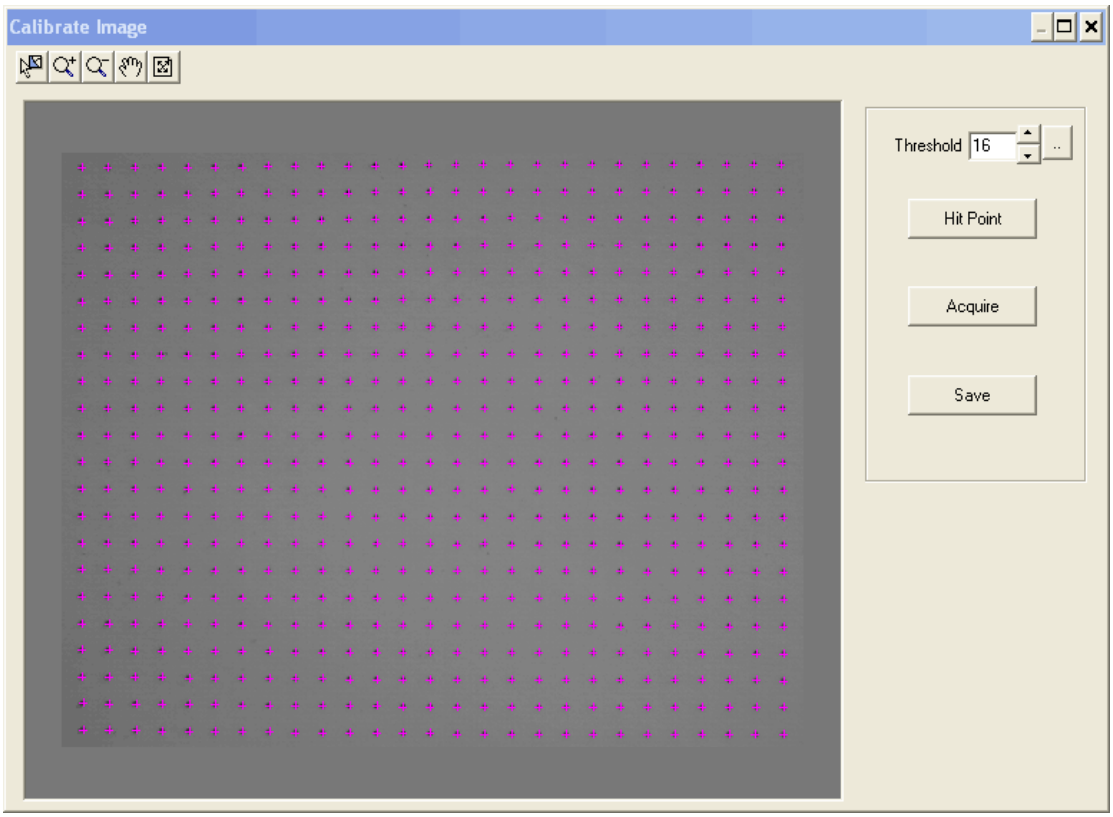
Power: Laser energy value

Set up more than three values, and then press "**OK**", the machine will be set according to the value of the automatic management of parameters, after the completion of the machine will automatically stop.

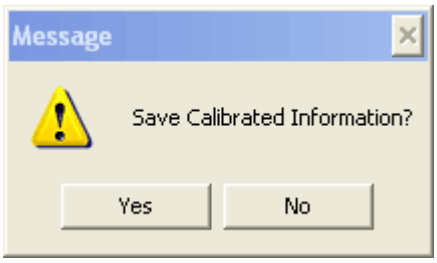
After completion, close the current software system "**Calibration Image**" interface, CCD will be moved to the center of the hole punched. If the point of the laser is not in the camera's current range, the camera should move the camera until it is able to take all of the points. As follows:



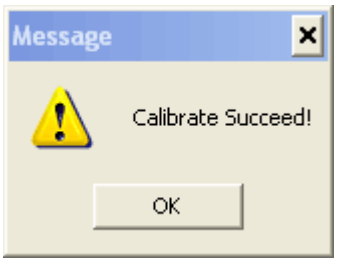
Click "**Range Cal**"-"**Acquire**", As follows:



Click "**Save**", As follows:



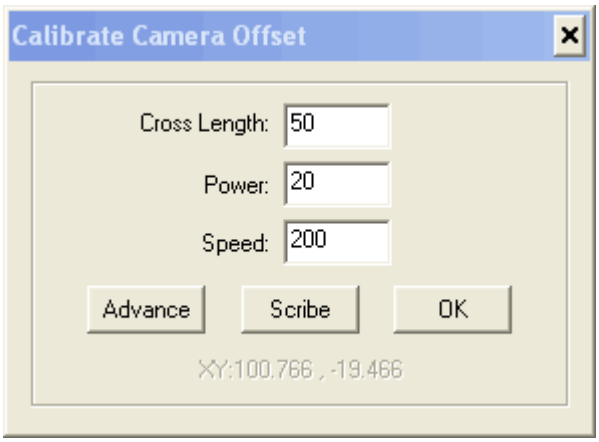
Click "**Yes** "-"**OK**", "**Range Cal**" is completed:



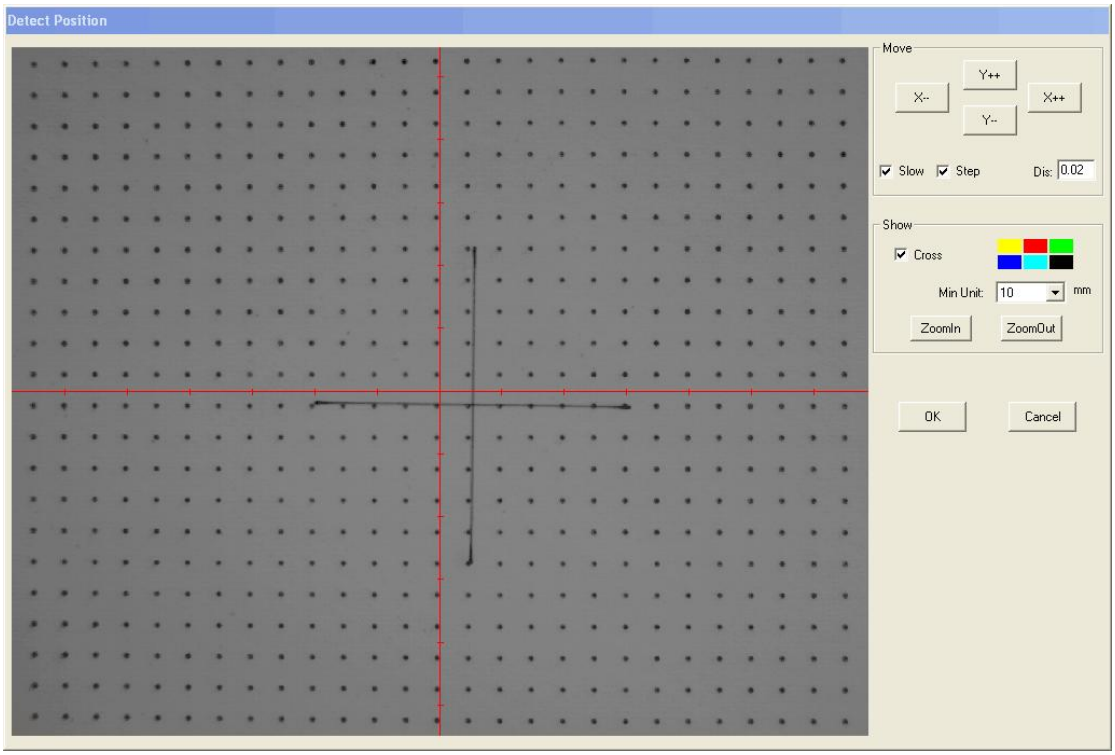
4.2 Offset calibration

Offset calibration is used to correct the offset value of the laser head and the camera.

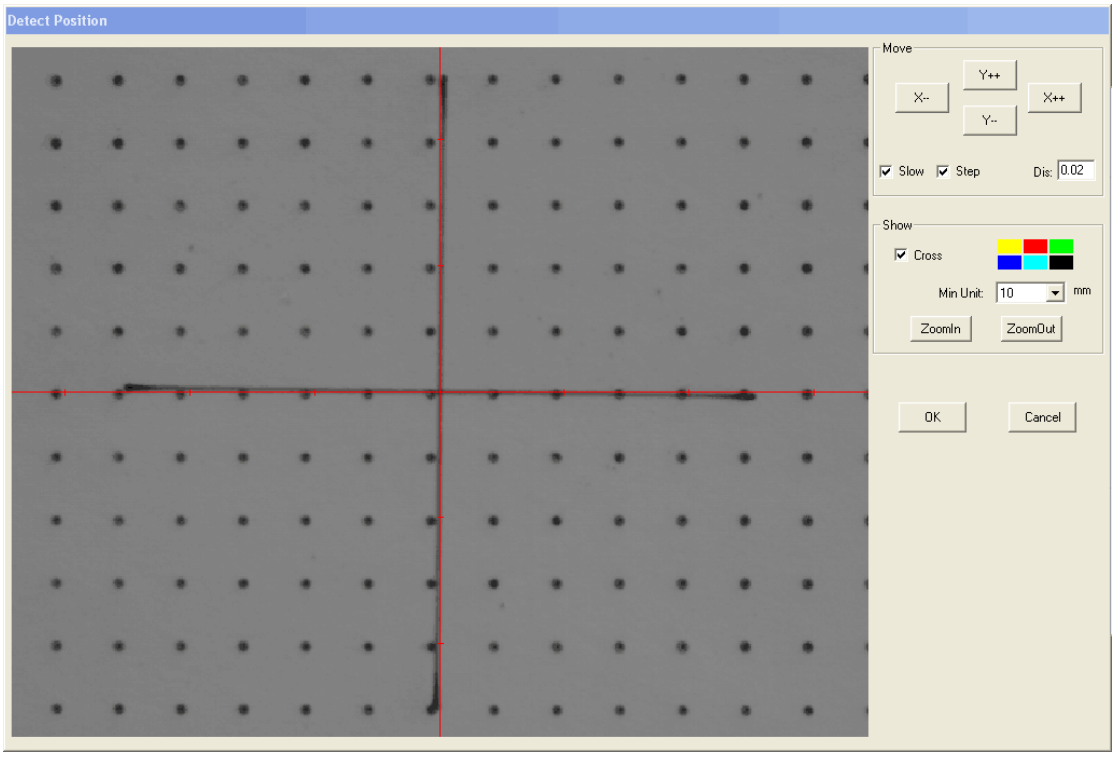
Click "**Offset Cal**", as follows:



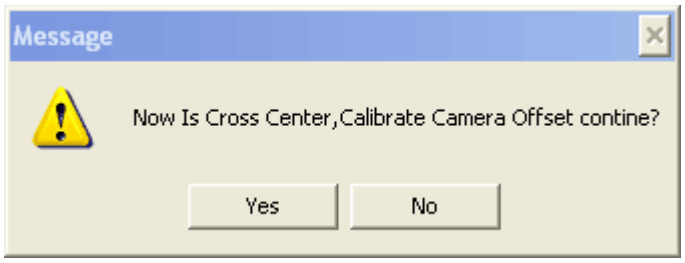
Click "**Scribe**", the system will be in the current position to specify the speed of 100, the score of the length of 50mm cross wire. Camera will automatically move to the center of the current cross wire. The following interface:



If the current cross wire center and the center of the camera does not coincide, moving the camera to ensure that both. The following interface:



Click "**OK**", the following interface:



Click “**Yes**”, "**Offset calibration**" is completed.

5 Model setup tools

5.1 Import

The icon on the corresponding toolbar is  .

Import software support data, including: *.PLT, *.AI, *.DXF, *.DST, etc.

Common *.PLT under the hook to take the CorelDraw graphics, import to the graphics and the PLT vector border graphics and pictures of the border overlap.

Press and hold down the CTRL button every time up and down or so, the distance to move the graph 0.05mm;

Press and hold down the CTRL+SHIFT key when each up and down about, the distance to move the graph is 0.025mm.

5.2 Export

The icon on the corresponding toolbar is  .

Export template editing vector data for *.PLT, or*.DXF .

5.3 Mode Rect

The icon on the corresponding toolbar is  .

Select template range operation.

5.4 Select

The icon on the corresponding toolbar is  .

Select the graphics you want to edit. Select a part of the figure or graphics, you can move, delete, change the layer and other editing operations.

5.5 Zoom In

Click on the button, the screen with the mouse click to enlarge the graphics data (data does not change the actual size).

5.6 Zoom Out

Click on the button, click on the screen with the mouse to reduce the size of the graphics data (data does not change the actual size).

5.7 Pan

Click the button, you can move the picture.

5.8 Zoom To Data

Click the button , you can fully display the processing data range.

5.9 Line

The icon on the corresponding toolbar is  .

Draw any line. Drag the mouse on the screen and click the mouse to draw any line. Click "C" key graphics can be automatically closed.

5.10 Ellipse

The icon on the corresponding toolbar is  .

Draw ellipse. Drag the mouse on the screen and click the mouse to draw an ellipse, press the Ctrl key while dragging the mouse can draw a circle.

5.11 Rectangle

The icon on the corresponding toolbar is  .

Draw a rectangle. Click the button, drag the mouse on the screen to draw a rectangle of any size. Press the "**Ctrl**" button and drag the mouse to draw a square.

5.12 Bezier

The icon on the corresponding toolbar is  .

Drag the mouse on the screen and click the mouse to draw the Bezier curve.

5.13 Rotate

The icon on the corresponding toolbar is  .

Used for rotating graphics. Click the "  button, select the desired rotation of the screen in the screen, and then click, you can rotate the graphics operations.

5.14 Hor Mirror

The icon on the corresponding toolbar is  .

5.15 Ver Mirror

The icon on the corresponding toolbar is  .

5.16 Array

The icon on the corresponding toolbar is  .

Array to copy selected graphic objects.

5.17 Buffer

The icon on the corresponding toolbar is .

Selected graphics objects.

5.18 Note Edit

The icon on the corresponding toolbar is .

Edit the selected graphics for node editing. Click on the button, the selected figure will be displayed in a small box will be displayed. As shown in the following figure:

Put the mouse on the node, drag the mouse to change the shape of the graph.

To put the mouse on the graphics, the mouse into a cross, then double-click the mouse to increase the node. If you need to delete the node, just put the mouse on the need to delete the node, click the "**Delete**" key.

5.19 Split Curve

The icon on the corresponding toolbar is .

Cut the selected graphic objects.

5.20 Split Curve

The icon on the corresponding toolbar is .

Set output sequence.

5.21 Combine Line

The icon on the corresponding toolbar is .

Merge linked data.

5.22 Smooth Line

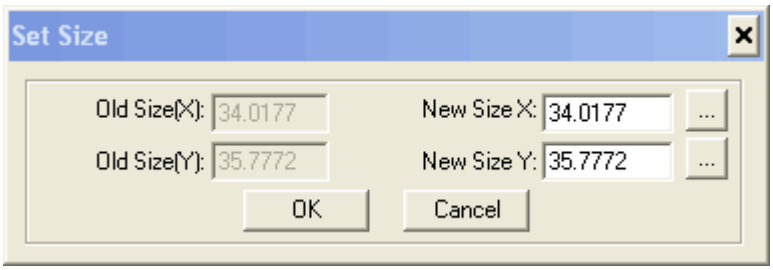
The icon on the corresponding toolbar is .

Smooth handling of the curve, can improve the speed of cutting and stability.

5.23 Size

The icon on the corresponding toolbar is .

Zoom graphics. Click the "select" button to select the desired zoom in the screen, and then click the button, which appears the following dialog box:



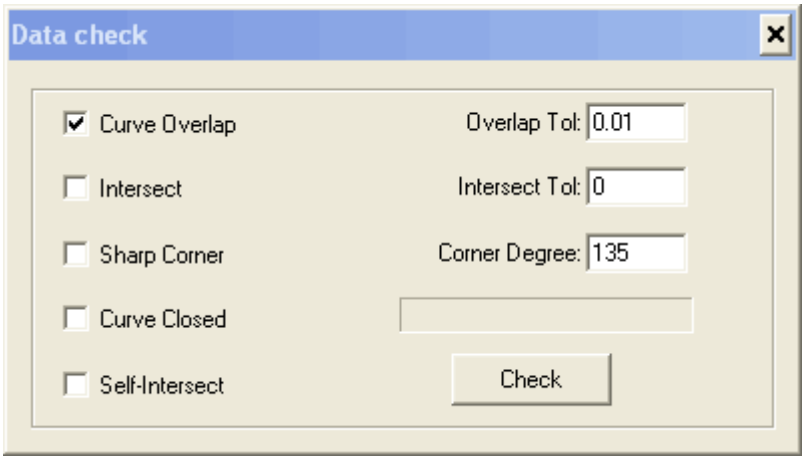
Enter the required X, Y direction of the length, click OK to change the size of the graphics.

If you need graphics scaling, you first enter the X direction or the length of the Y direction, and then click the button to click the dialog box.

5.24 Check data

The icon on the corresponding toolbar is .

Check the overlap of the imported graphic objects. Click “ ” , that is the following dialog box:



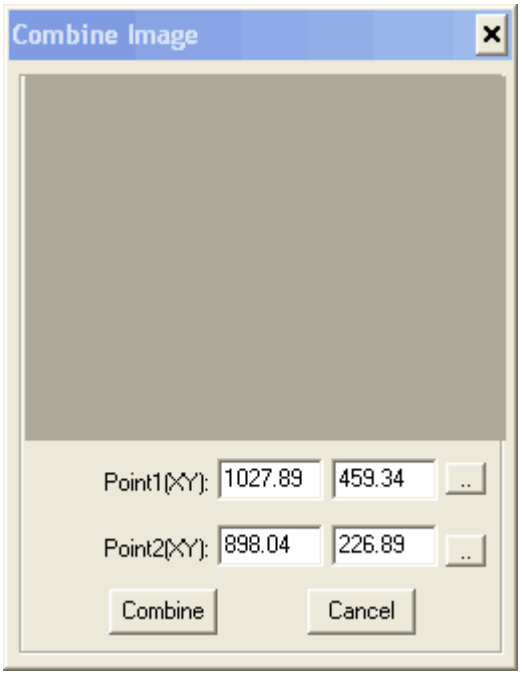
5.25 Set Start Point

The icon on the corresponding toolbar is .

Modify the graphics processing its initial location.

5.26 Combine Image

The icon on the corresponding toolbar is .



The system is based on two points, and the whole image of the area is mosaic.

5.27 Export Image

The icon on the corresponding toolbar is .

This feature will be saved as a *.bmp format to facilitate the CorelDraw format under the edge of the drawing edge of the edge of the drawing process.

5.28 Undo

The icon on the corresponding toolbar is .

Return to the previous state of editing.

5.29 Redo

The icon on the corresponding toolbar is .

Redo the previous state.

5.30 Cutting data slicing

Data layer, can be set to different layers of processing parameters.

Appendix 1 system calibration test pattern